THE

JOURNAL OF GAS LIGHTING.

PUBLISHED MONTHLY.

No. 78, Vol. IV.] LONDON, JULY 10, 1855. [Price 1s., In America 30 Cents.

TO GAS COMPANIES.

BOGHEAD CANNEL COAL.—This is the most highly bituminous coal known, and, therefore, peculiarly adapted for mixing with inferior coals in the Manufacture of Gas, for which purpose it is exclusively used. One ton of it yields 15,486 cubic feet of gas, according to Dr. Fyfe's experiments, and in actual working the produce is at least 13,500 feet of the specific gravity of ·775; and a burner, consuming at the rate of 1 cubic foot per hour, gives a light equal to 8½ spermaceti candles, each consuming 120 grains of sperm per hour. The light yielded by one ton of this coal is equal to that from 1990 lbs. of sperm candles; whereas that from the same quantity of Newcastle Caking Coal is only equal to 420 lbs.; and that from the best Wigan Cannel Coal is only 750 lbs. of sperm candles. It can be shipped at any of the ports in the Frith of Forth or the Clyde.

For terms and other particulars apply to

R. W. Kennard and Co.,
Sole Agents,
67, Upper Thames-street, London.

GAS ENGINEERS.

WANTED, by a Metropolitan Gas Company, a SUPERINTENDENT ENGINEER of great energy, ability, and experience in the most modern and approved mode of Gas-Making. He must be competent to supply Plans and Estimates for the construction of Buildings, and every description of apparatus connected with gas-works, and superintend the erection of the same. The salary to commence will not be less than £300 per annum. Experience in the use of clay retorts indisputable. Applications, enclosing copies of testimonials, stating age, particulars of former engagements, to be addressed to "Gas Engineers," Watling's Newspaper-office, 409, Strand, London, by Monday, the 16th of July.

ORIENTAL GAS COMPANY.

THE Directors require two Retort SETTERS to proceed to Calcutta. They must understand both Clay and Iron Settings, and be perfectly conversant with gas-work in general.

Applications, prepaid, stating terms required, age, there last or now employed, to be sent to the company's office, 127, Leadenhall-street, London, on or before the 17th inst.

Oriental Gas Office, July 6, 1855.

ON Sale, two Second-hand Gasholders, 35 feet diameter, by 18 feet deep. Apply to T. Proud, Gas Works, Horsely-field, Wolverhampton.

GAS APPARATUS.
TO GAS COMPANIES AND OTHERS.

TO be disposed of, sundry Gas Appa- RATUS, consisting of HYDRAULIC MAINS, H and DIP-PIPES, RETORT MOUTH-PIECES and CONNECTIONS; two VERTICAL AIR CONDENSERS, three sets DRY-LIME PURIFIERS, with SIEVES, &c., CENTRE VALVES AND CONNECTIONS; also the FRAME-WORK for a Single-Lift Gasholder, 50 ft. diameter, with Columns, Balance-Weights, and Pulleys.

For further particulars apply to Mr. H. Gore, Gas Engineer, Leeds, Yorkshire.

COWEN'S PATENT FIRE CLAY RETORTS.

JOS. COWEN and CO.,

BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,

Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas Retorts and other Objects in Fire Clay."

J. C. and Co. have been for many years the most extensive Manufacturers of Fire Clay Retorts in the United Kingdom; and orders for Fire Clay Retorts of all shapes and dimensions, Fire Bricks, and every other article in Fire Clay, are promptly executed at their works as above.

Also, owners of Blaydon Burn Colliery, from which "Cowen's Cannel Coal," extensively used in Metropolitan and other Gas Works, and "Cowen's Garesfield Coal," are obtained. From the latter, "Cowen's Garesfield Coke" is made, the superior quality of which is well known.

Coal and Coke Office, Quay-side, Newcastle-on-Tyne.

PATENT IRON TUBES AND FITTINGS, OF ALL KINDS AND SIZES, FOR GAS, STEAM, AND WATER.
LAP-WELDED FLUES FOR BOILERS.
GALVANIZED TUBES, SHEET-IRON, &C.

JOHN RUSSELL AND CO.,

CHURCH-HILL, WEDNESBURY,

Tubing Manufacturers from the Commencement of Lighting by Gas, and previously Contractors with the Government and East India Company for Gun Barrels, which were also first supplied by them to Gas Companies, and used for the distribution of gas.

LONDON ESTABLISHMENT,
69, UPPER THAMES-STREET.

N.B. Every Tube is proved by Hydraulic Pressure before leaving the Works.

12,950 CUBIC FEET OF GAS,

Specific Gravity ·820, produced from a ton of BATHVILLE CANNEL COAL, a Coal identical with that named Bathgate, Boghead and Torbane Mineral.

JAMES LAWRIE and CO.

COUSIN LANE, UPPER THAMES STREET,
Sole Agents.

Messrs. Lawrie and Co. are also Sole Agents for the excellent KNIGHTSWOOD CANNEL, used by London Companies, and are Makers of RETORTS, Clay and Iron; SOCKET PIPES; and all kinds of CASTINGS.

CANNEL COAL.

RAMSAY'S NEWCASTLE CANNEL was discovered by the Advertiser in 18 8. Cannel Coal was then little used in London: after surmounting much opposition, it has become the principal Cannel Coal used in the Metropolis, and has greatly assisted in improving the London gas. Its joint products of gas of high illuminating power, and coke of good quality, make it one of the most economical coals known. It is used by all the London Gas Companies, as well as by many Provincial and Foreign. The Crystal Palace was lighted from it in 1851, and the Post-office, Bank, and *Times* Office, are at present.

FIRE-CLAY RETORTS.

FIRE-BRICKS of all descriptions. Manufactory established in 1804.

RAMSAY'S GARESFIELD COAL and COKE.

Bone and Artificial Manures of all kinds.

Address G. H. Ramsay, Offices, Broad-chase, Newcastle-on-Tyne.

April 27, 1854.

INSPECTOR WANTED.

A Metropolitan Gas Company is in want of an INSPECTOR. He must be of good address, active, energetic, and quick business habits. One of experience in a similar position, and of mechanical knowledge, preferred. Age not to exceed 35. Apply, stating all particulars of former and present engagements, to "Inspector," Watling's Newspaper Office, No. 409, Strand.

HOLYHEAD GAS-WORKS.

TENDERS are required, on or before the 14th instant, for the BUILDINGS and IRON-WORK connected with these Works, and STREET MAINS.

Plans and Specifications on view at Mr. H. G. Hughes, Druggist, Holyhead.—Tenders to be addressed to Captain John Roberts, Chairman of the Holyhead Gas Committee, Holyhead.

George Walcott, Engineer.

HUNTINGDON AND GODMANCHESTER GAS WORKS.

TO be Sold by Auction, by Mr. G. M. FOX, at the George Inn, Huntingdon, on MONDAY, July 23, 1855, at Three o'clock in the afternoon precisely (subject to such conditions of sale as will be then produced, unless previously disposed of by Private Contract, of which due notice will be given), the GAS MANUFACTORY and GAS HOUSE, situate at Huntingdon, in the County of Huntingdon; and the Dwelling-house, Outbuildings, and Yards, situated on the West side of the River Ouse; together with the Gasometer, Purifier, Condenser, Mains, Pipes, Pillars, Brackets, Lamps, and other apparatus and effects thereto belonging, used for lighting the two Boroughs of Huntingdon and Godmanchester with Gas; and full benefit of all then existing Contracts entered into with the Consumers. The annual Rental arising from the Public Lights is about £110, and from Private Lights £703.—Further particulars may be known on application to Mr. Fox, the Auctioneer; Mr. Huntbach, Solicitor, Huntingdon; or Messrs. Robinson and Atkinson, Solicitors, Beverley and Hull.

Beverley, June 21, 1855.

JAMES RUSSELL AND SONS,

WEDNESBURY, STAFFORDSHIRE, and 81, UPPER GROUND STREET, BLACKFRIARS, LONDON,

PATENTEES, INVENTORS, AND FIRST MAKERS OF

WROUGHT-IRON GAS TUBING,

commencing from the *earliest* introduction of Gas Lighting into this country.

Manufacturers of every size and description of Wrought-iron Tubes and Fittings, from one-eighth up to seven-inch internal diameter, for Gas, Steam, or Water.

PATENTEES AND MANUFACTURERS OF THE

LAP-WELDED FLUES,

for Marine, Locomotive, and Stationary Boilers.

Inventors and Manufacturers of

IMPROVED STEAM AND GAS COCKS,

in Iron or Gun Metal, from three-eighths to six-inch bore. Manufacturers of every description of hand-screwing

STOCKS, DIES, AND TAPS,

for Gasfitters and Engineering purposes.

Manufacturers of Coils, for hot water and other purposes; Casing of all sizes, with flush joints, for Well-sinkers; Blasting Tubes; Buffer Tubes for Railway Carriages; Tubes for Roller Beams; Spindles, Shafts, Pendulums, Hydraulic Presses, Core Bars, Steam Gauges, &c. &c.

James Russell and Sons beg to call the attention of Engineers, Builders, Water Companies, and others, to their

PATENT ENAMELLED TUBES,

which preserve water or other liquids conveyed by them in a perfectly limpid condition; whilst the Enamel itself is as pure as the finest Porcelain, possessing the rare recommendation of being entirely free from any noxious ingredient in its composition.

Lists, Estimates, &c. &c., forwarded on application; orders, from 10 to 100,000 feet of gas tube, executed at twelve hours' notice if required; and quality may be safely relied upon, as all goods are most carefully tested before leaving the Works.

James Russell and Sons have great pleasure in calling attention to the annexed award:—

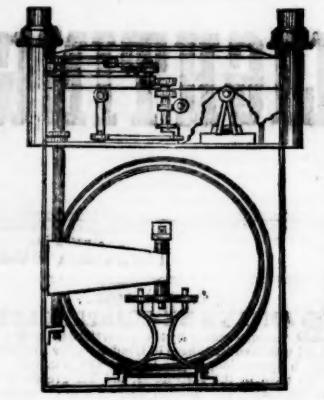
"EXHIBITION OF THE INDUSTRY OF ALL NATIONS, NEW YORK.

"Office: No. 6, Charing-cross, London, April 6, 1854.

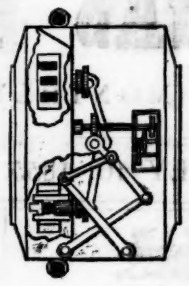
"Gentlemen,—I have much pleasure in informing you that the Jury has awarded to your firm 'Honourable Mention for Lap-welded Iron Tubes.' You are at full liberty, if you deem it likely to promote your mercantile advantage, to affix to these articles, during the season 1854, a card whereon this Award is printed, and also your prices, with name of agent, &c.—I am, gentlemen, your obedient servant,

"John H. Bohn, Secretary.

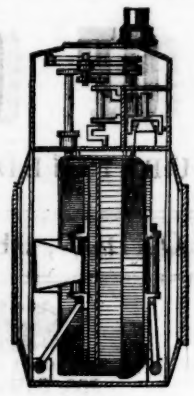
"Messrs. James Russell and Sons, Wednesbury, Staffordshire."



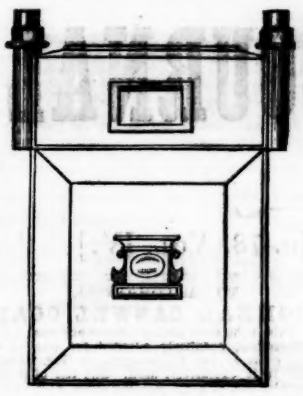
ELEVATION, with Front removed and Valve-box broken.



PLAN. Valve-box broken away to show Valves.



SECTIONAL ELEVATION.



FRONT VIEW.

W. J. WARNER'S PATENT DRY GAS METER.

THOMAS EDGE

begs to inform Gas Companies and Consumers that he has become the Proprietor of the above Patent; and that, having made arrangements for the Manufacture of the same on an extensive scale, he is prepared to supply all sizes in any quantities.

The advantages of this Meter have been recognised by the highest authorities, and those who have tested and used them.

The most obvious improvements are—

1. The movements of the Valve Cover at its base, so that no deposition on the face of the Valve can cause the Cover to tilt, and thus allow the Gas to pass without registering.
2. The protection of the whole of the Machinery in the upper chamber from the action of the Gas, which has never before been accomplished.
3. Greater simplicity, and a less amount of flexible material in the Diaphragms than in any other make.

These Meters, and also the Patent Lever Valve Wet Meters can have either the Common Index or Patent Indicator attached; and are manufactured, with Station Meters, Governors, Pressure Registers, Gauges, Gas Fittings, and every description of Gas Apparatus, at the Works, Great Peter-street, WESTMINSTER.

CITY OFFICE, and Depôt for Meters, Pipe Barrel, and Fittings, 9, WALBROOK, Mansion-house.

NEW INSTRUMENTS for the USE OF GAS COMPANIES.

THOMPSON'S BROMINE TEST.

APPARATUS, INCLUDING GRADUATED TUBE AND EQUALISING CYLINDER, £1. 1s.

Bromine, 3s. per ounce.

AN APPARATUS FOR TESTING THE PRESENCE OF BISULPHURET OF CARBON IN GAS.

It has frequently been remarked by chemists that even when the acetate of lead test is applied to coal gas, and indicates perfect freedom from sulphuretted hydrogen, indications are still given during its combustion which would lead to the supposition that some other compound of sulphur exists in it. The above instrument affords positive proof that this is the case, and leaves little doubt that that compound is sulphuret of carbon. This test will detect the presence of sulphur in whatever form it may exist, and is much more delicate than the acetate of lead test, even for sulphuretted hydrogen.

Cost of apparatus, £2. 2s.

A REGISTERING PRESSURE GAUGE.

It is important to gas companies to know the pressure at various parts of their districts during the successive hours of the night, for the better regulation of their initial pressure at the Works. This compact apparatus, capable of being placed in a space of less than one foot cube, is intended to supply this information. Price £7. 10s.

Station Meters, Pressure Gauges, Photometers, Specific Gravity Apparatus, &c.

CONSUMERS' METERS

at the List price, with a liberal discount to wholesale purchasers.

ALEXANDER WRIGHT,
GAS ENGINEER,
55, MILLBANK-STREET, WESTMINSTER.

TO GAS COMPANIES.

WANTED to Purchase, a Second-hand GASHOLDER, in good condition, capable of holding from 6000 to 10,000 cubic feet.

Apply to J. WRIGHT, SUDBURY, Suffolk.

FOR SALE.

A Few Lengths of Hydraulic Main, 16 in. diameter; H and DIP PIPES, 4 in. diameter; and a few 7-in. VALVES.—Apply at the Gas Works, OLD KENT ROAD, LONDON.

TO GAS COMPANIES.

FOR Sale, a Set of Six Dry-Lime PURIFIERS, 3 of them 4 ft. 8 in. square, and 4 ft. deep; the other 3 are 6 ft. 3 in. long, 4 ft. 6 in. wide, and 3 ft. 6 in. deep, with Centre Valve and 6-in. Connections.

Also a STATION-METER, made by Crosley, capable of registering 110,000 cubic feet in 24 hours.

The above are thrown out of use in consequence of being replaced by others of larger capacity.

Applications to be made to Mr. THOMAS ROBINSON, Manager, Gas Works, BURNLEY; or to Mr. JOHN BRENNAND, BURNLEY.

Just Published, 8vo. 4s. 6d.; neatly bound in cloth, 5s.

THE Patent Laws of all Nations: to which is prefixed a concise History of the Measures adopted to obtain the Patent Law Amendment Act, 1852. By Mr. E. J. HUGHES, at the Patent Offices, 123, Chancery-lane, London; 17, Cross-street, Manchester; and 14, Clayton-square, Liverpool, where the work may be procured.

CHEAP COKE and COAL SHEDS of CORRUGATED IRON,

FOR GAS AND RAILWAY COMPANIES.

FRANCIS MORTON and CO. erect Sheds of 35 feet and 70 feet Spans at about the following very low prices, exclusive of Stone or Concrete Foundations for the Columns, viz.:—

With Cast-iron Columns ..... 9s. 0d. } per Square Yard of Ground covered.
With Wood Columns ..... 8s. 6d. }

The loss arising from the exposure of Coal and Coke to the weather is so great that the cost of these Sheds is very soon saved.

Estimates and Plans, with any further particulars, will be supplied on application to

FRANCIS MORTON and CO.,
CORRUGATED AND GALVANISED IRON WORKS,
No. 13, JAMES STREET,
(Late the Coalbrookdale Company's Premises),
LIVERPOOL,

Manufacturers of all kinds of Iron Roofing, Corrugated Iron, Galvanised Gas and Water Pipes, Galvanised Sheet Iron for Gas Companies instead of Block Tin, &c.

TO GAS COMPANIES, ENGINEERS, AND MERCHANTS.

EDWIN DIXON,
WROUGHT-IRON TUBE WORKS,
WOLVERHAMPTON,

begs with the utmost confidence to solicit the order of Gas Companies, and persons using or selling Gas Tubes. Having for a long period supplied the largest Gas Companies and Consumers in the United Kingdom and the Continent with unvarying approbation, and almost exclusively the Local Boards of Health under Government Engineers, with Galvanised Iron Tubes and Connections, it has become an inducement to make such facts known.

Large Stock always being on hand, orders of any magnitude, from 10 to 100,000 feet, are executed promptly, and carefully tested by powerful hydraulic pressure before leaving the Works.

Boiler Tubes, Core Bars, Hollow Spindles, and Hydraulic Press Pipes, to resist 5000 lb. to the square inch, made on the shortest notice.

TO GAS COMPANIES.

WANTED, a Situation as Manager or ENGINEER of Gas Works. The advertiser is acquainted with the making of gas. Has designed and drawn out plans of gas-works, and all kinds of gas machinery in detail. Satisfactory reference as to experience, ability, and character. Apply by letter to W. M., care of the Editor of this JOURNAL, 3, Parliament-street, WESTMINSTER.

TO GAS ENGINEERS AND OTHERS.

CONGLETON Gas Works to be Let.—Notice is hereby given, that the profits and advantages arising from the Gas Works belonging to the Congleton Gaslight Company will be let to the best bidder, by private tender, subject to the approbation of the Directors of the said Company, for the term of three, Five, or Seven years, at the option of the Directors, from the 22nd day of August next, subject also to conditions now prepared, and lying at the office of Mr. Wilson, Solicitor, Congleton, for inspection. The taker will be required to find two sureties for the due fulfilment of his contract. Tenders for each or any of the said terms to be forwarded to the said office, with the names of the proposed sureties, on or before the 1st day of August next. By order,

JOHN WILSON,
Law Clerk to the said Company.

Congleton, June 19, 1855.

WILLIAM PARKINSON & CO.
(Successors to the late Samuel Crosley),
COTTAGE-LANE, CITY-ROAD, LONDON,

Beg most respectfully to announce that, in addition to the continued manufacture of GAS METERS, they manufacture Meters for measuring Water, Spirits, &c. (commenced under Patent, in 1849, by the late Mr. William Parkinson).

N.B. These Meters are as simple and durable as the Gas Meter, and as correct as that instrument under the most careful manipulation.

IRON TANKS FOR GASHOLDERS.

TO BE SOLD, Two Iron Tanks, about 34 ft. diameter, by 18 ft. deep, as they stand, quite convenient for water carriage. They are as good as new. A Telescope Gasholder of the above size, together with Suspension Frame, Balance Weights, Guide Rods, Pulleys, &c., may also be had, if required.

Apply to the Engineer, Phœnix Gas Works, 70, Bankside, SOUTHWARK.

EDWARD RUSSELL,
ALMA TUBE WORKS,
WALSALL.

Manufacturer of Wrought-iron Tubing, for Gas, Steam, and Water; Stocks, Taps, and Dies, and all kind of Gas Fittings.

ROBERT MACLAREN,
(Successor to Andrew Liddle and Co.,)
IRONFOUNDER AND GAS ENGINEER.

Manufacturer of Patent Iron Tubing, Block Tin, Lead, and Composition Tubing. Cast-iron Gas and Water Pipes of all sizes, and every description of Gas Apparatus.

GLOBE FOUNDRY, GLASGOW.

GASHOLDER AND CAST-IRON TANK FOR SALE.

TO be sold, a gasholder (32 feet 4 inches diameter, by 12 feet 9 inches deep) and CAST IRON TANK, with 4 Columns, Pulleys, and Balance Weights. The above may be seen at the Monkwearmouth Works of the Sunderland Corporation Gas Company, and further inforation obtained on application to the undersigned, by whom offers in writing will be received until July 31st.

JOHN H. COX, Secretary.

61, Fawcett-street, SUNDERLAND, June 29, 1855.

THE

JOURNAL OF GAS LIGHTING.

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NOTICES.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

The Journal of Gas Lighting has been duly registered at the General Post Office for transmission abroad.

Subscribers who have not paid their subscriptions for 1854 are requested to remit 12s. for the entire year, or 6s. for the half-year, by Post-Office Order, payable to Thomas G. Barlow, at the Charing-cross Money Order Office.

The subscription is 10s. per annum if paid in advance, or 12s. on credit, payable in two sums of 6s. each, due in June and December of each year. All subscriptions commence from the 10th of January in each year.

Communications and orders for Advertisements to be addressed to the Editor, No. 3, Parliament-street, Westminster.

TO CORRESPONDENTS.

W. S.—*Mr. Barlow has taken steps which will probably have the effect of speedily putting an end to the scurrilous libels upon his professional character, which the* Gas and Water Times *has, from time to time, published for the gratification of its patrons. It is to be regretted, however, that the real culprits cannot be reached, and that the printer, instead of the skulking scribblers of that publication, will have to pay the penalty which the law awards to the malicious slanderer.*

Circular to Gas Companies.

The disinterested reader will not have failed to remark, that in the observations we made last month on the much-disputed question of the relative advantages of wet and dry meters, we carefully abstained from the expression of any opinion of our own upon the subject, and confined ourselves to suggesting to every gas engineer and manager the importance of a careful investigation of the subject, with the view of elucidating facts, upon which a sound opinion might be grounded. We particularly instanced the case of the Great Central Company, which, from the large number of dry meters it employed, had the means of throwing some light on the question, by determining whether its rate of loss by leakage and defective registration in the meters *remained constant, or was on the increase.* If it has remained without appreciable change during the last three years, and continues so for the next five or six, the practical value of the dry meters used by the Great Central Company would be established beyond all dispute; but if, on the contrary, it is gradually on the increase, the apprehensions of those who doubt their accuracy will be confirmed. The question is a great and important one; and, though we have no direct interest in its solution beyond that of the general welfare of gas companies, we are willing to contribute £50 towards the expenses of preparing such accounts of the experiment now in course of trial by the Great Central Company, as we have suggested. It is admitted that their elements exist, and the failure to produce them may possibly be adduced as proof that the facts they disclose do not support the views of the parties in whose custody they are.

Interested parties have professed to see in our observations a wholesale attack upon dry meters generally, and have appealed to the fact of these instruments being largely adopted by gas companies, as conclusive evidence of the estimation in which they are held. It is quite true that many companies have been induced to permit their adoption, not, however, from any conviction of their advantages, but in consequence of the skilful use made by the dry meter manufacturers of the active competition existing amongst the gas companies themselves. This "black mail" is estimated by some experienced gas engineers to amount to at least one per cent. upon the capital of the companies so circumstanced; and a tolerably extensive acquaintance with British gas engineers, has failed to bring to our knowledge a single one whose opinions are entitled to any weight, who is prepared to maintain that, except in a few peculiar situations, he would, if left to his own unbiassed judgment, employ a dry meter in preference to a wet one. One astounding instance has been mentioned to us of a company thus situated, the manager of which declared that he was prepared to offer to substitute wet meters for all the dry ones used by his company, at his own expence, and to take one year's increased rental as his remuneration. Even this, however, we do not accept as conclusive evidence against the use of dry meters indiscriminately. The original construction or workmanship of those in question, may have been defective; and they may, possibly, have been subjected to more than the ordinary trials by which such instruments are affected; and hence we are not inclined to place such entire reliance on the results as would induce us to draw a definite conclusion. The experiment of the Great Central Company is free from any such drawbacks; and we are, consequently, the more anxious that the facts in connection with it should be made public.

Something has been said about the leakage of this company being less than that of any other metropolitan gas company, and so it ought to be. It has new mains and service-pipes; the former of large calibre, and capable of delivering the requisite supply of gas at low pressures. Under these circumstances, it would be strange if the leakage was not less by one-half than that of older companies whose mains were originally of small dimensions, laid at different periods, as the demand for gas increased, and whose service-pipes had been buried in the ground from 25 to 40 years.

ON SOME RECENT PROCEEDINGS AGAINST GAS COMPANIES.

It would appear that public opinion is running very strongly against gas companies at the present day, and that they are destined to become Ishmaelites in our strange society. Everybody's hand is against them. They are attacked in a wholesale manner by the Government officials; in detail, by all manner of vexatious prosecutions. Formerly it used to be said that bodies corporate (in law) had "neither souls to be saved nor seats of honour to be kicked"—they were held to be intangible, and to have no consciences, in fact. But now the tables are turned; the public has shaken off *its* conscience, so far as companies are concerned; and, if the slightest opportunity be furnished, it really appears that they are considered fair objects of plunder. And yet the capital invested in public companies, whether gas, or water, or canal, or railway, is as much private property as any other; and the systematic leaning of the Bench against companies, whenever they are so un-

fortunate as to appear in court, and the universal tendency to extort from companies, which exists to so notorious an extent, are as great injustices when brought to bear against them as if they were brought to bear against private persons.

These remarks obtruded themselves upon us when reflecting upon some evidence lately given before the referee, in the case of *Broadbent v. the Imperial Gas Company*.* Perhaps it would not be desirable to dwell much upon the character of this evidence, because, in the first place, it has only been "*ex parte*;" and, in the second, it would not be consistent with our duty as journalists to seek to influence the decision of a cause still under investigation. Yet we cannot but remark that the scientific evidence, such as it is reported to have been, does not appear to us to be at all conclusive; and that many of the assumed causes of destruction of vegetable life, which are, in fact, the basis of the question involved, are far from being what philosophers would call "*veræ causæ*." Our reason for dwelling on the subject at present is, however, because this particular action appears to us to be only one of a series to which all gas companies are exposed, and because on all sides there appears to exist a tendency to apply the utmost rigour of the law—to exaggerate even the ordinary annoyances which can be inflicted under shelter of "the perfection of human reason"—against a class of undertakings essentially necessary for the happiness and comfort of our society.

For, in the course of the present sessions of Parliament, the Minister of Public Health (as he aspires to be called) has brought the whole weight of governmental influence to bear upon the bill presented by the City of London Gas Company, and in opposition to it; avowedly, because he seeks to drive all such establishments out of populous districts. The Imperial Gas factory at Fulham is, even at the present day, nearly isolated, and in the midst of market gardens—a class of agricultural establishments themselves by no means free from reproach, on account of their noxious or offensive effluvia; Yet, even in such a position, the gas company is not safe; and if Mr. Broadbent should obtain a verdict in his favour, there is no saying to what distance the company may not be compelled either to purchase surrounding lands or to pay compensation for crops. Gas companies, it seems, must be driven out of towns; if they go into the country, they are to be exposed to be plundered on every side; and all the ingenuity of scientific men is to be brought against them, to prove that the evils resulting from bad cropping, perhaps, are to be laid to their charge. Really the state of our law in these matters is very unsatisfactory; and, if many cases similar to the one under notice should occur, it will become necessary for the gas companies themselves to consider whether it would not be desirable that some description of inquiry, "*de commodo et incommodo*," were established (in the manner and for the purposes described in a former article in this JOURNAL, upon the French legislation with respect to unwholesale trades), so as to enable them, before erecting a factory, to know with tolerable precision the extent of their liabilities. Actually these liabilities appear to be unlimited—at least, they may extend to an amount representing the fee-simple of the whole neighbourhood affected by the real or imaginary diffusal of the gases resulting from their manufacture.

The hardships, so far as the gas companies are concerned, is practically the greater, in consequence of the prejudices lately created against them by the sanitary empirics in the pay of the Central Board of Health. Whatever harm they may produce, whatever annoyance they may occasion, has been so systematically exaggerated by the above-cited (would-be) scientific authorities, that the public has almost been led to consider gas factories to be intolerable nuisances, and the sources of every conceivable evil. The unscrupulous manner, moreover, in which the gas companies have been accused of monopoly and spoliation, appears to have produced the impression that there was a species of rude retributive justice in plundering them. The consequence has been that everybody's hands are against the gas companies; and there is a manifest desire to throw upon them responsibilities to which they are by no fair means liable. The most dangerous anomaly arising from this indiscretion of public opinion is, however, to be found in the notorious leaning of the Bench in favour of every individual who appears in court against a company. This prejudice, be it observed, is not confined to the companies which exercise the (so-called) offensive trades; all such bodies suffer from it to a greater or less extent; but, inasmuch as the gas companies are brought more frequently and more directly in contact with the every-day occupations of society, they are made to suffer from its effects the most severely.

It is rather singular that the attempt to prove that gas factories are destructive to vegetable life should be revived at this late period; and it may be important to recall public attention to the fact, that this accusation was made many years since, in a very similar manner to that adopted in Mr. Broadbent's case. About the period of the first application of gas to public lighting, it happened that many trees died, in an apparently unaccountable manner, in the districts where the pipes had been laid; and the public, reasoning in its usual style, "*post hoc, propter hoc*," immediately attributed the phenomenon to the introduction of gas. It was found, however, fortunately for the interests of society, that the trees in question had been destroyed by a hitherto unnoticed insect. May not this also be the case with other instances of the destruction of vegetable life near gas-works? At any rate, gas-lighting has now become to such an extent a public necessity, that it must be had. "*Celui qui veut la fin, veut les moyens*," says the French proverb—he who desires the end must abide by the means. If gas must be had, the public must support the inevitably contingent inconveniences attached to its manufacture; and it is the interest of the public also to remove all the difficulties, to oppose the prejudices, which can only tend to enhance the cost of a manufacture it will ultimately have to pay for out of its own pockets. The adage is true, collectively as well as individually, that "honesty is the best policy;" and, in the end, it will be the public at large which will suffer for the unfair pressure lately brought to bear upon gas companies.

* *Vide* report of trial in the JOURNAL OF GAS LIGHTING for June, 1854, page 482.

THE LETTER FROM THE GENERAL BOARD OF HEALTH TO LORD PALMERSTON, ON THE CONSUMPTION OF SMOKE.

THERE is a popular definition of the word "Romance" which so admirably characterises the documents issued by the centralisers of Whitehall, that it may fairly be applied to those singular productions. In common language, a romance is said to be "a fiction founded upon fact;" and there is so remarkable a mixture of fiction and fact in the reports of the *Central* Board of Health, as, in our opinion, to justisfy that name being given to them.

One of these interesting documents, "The Romance of the Consumption of Smoke," has lately been brought into public notice, although it appears to have been composed in the month of July, 1854, in reply to an inspiration from the "Magnus Apollo" of unconstitutional government, Lord Palmerston, dated Oct. 31, 1853. Evidently the genius so inspired is not precipitate, and its productions are not brought forth so rapidly as to entitle them to indulgence on the same plea which was urged by the female dog, to account for its offspring being born blind. The romance writers of the board took nearly nine months to prepare their answer to Lord Palmerston's letter; and a nearly similar interval appears to have elapsed before their elaborate production was presented to the public in general. After all, there may be nothing extraordinary in the delay which has taken place in the publication of this romance. Red tape is never in a hurry; and, so far as the real value of the document in question is concerned, it is doubtful whether any good will arise even from its tardy publication. It is, however, so strongly marked by the usual characteristics of the productions of the *Central* Board of Health, and is so likely to mislead ordinary inquirers, that we have felt it advisable to devote more of our space to its examination than it intrinsically deserves.

In the first place, it is to be observed that Lord Palmerston's letter to the *Central* Board of Health, requesting that body to make inquiries amongst those acquainted with the means for the prevention of smoke, is dated Oct. 31, 1853. The "Act to abate the Nuisance arising from the Smoke of Furnaces," &c., is dated Aug. 20, 1853. From this it would appear that, like the judge who hanged the man first and tried him afterwards, Lord Palmerston obtained the consent of the Legislature to the above-named very equivocal measure before he had even made the necessary inquires to enable him to judge with certainty of the possibility of carrying it into effect.

In the second place, we would observe, that the returns contained in pages 22 to 29 of the report, are so far from being a correct or full statement of the answers received by the officers deputed to inquire of the various manufacturers, that

they must be considered to be gross illustrations of the systematic suppression of unfavourable truths which is to be found in all the documents issued by the Board of Health. At any rate, these returns having been obtained before July, 1854, cannot be considered of much value as elucidating the working of a system which commenced in the month of August of the same year. We happen to know personally that similar questions to those contained in the above-cited returns have lately been addressed to many London manufacturers, and that the replies have been so decidedly unfavourable to the pet theories on this subject of our maudlin philanthropists, that they are tolerably certain of not being published. We have every reason to suspect that a similar course has been followed in preparing the document before us, especially as it was elicited during the reign of the (now) violent administrative reformer, Mr. Chadwick, whose powers "of making returns comfortable" were so universally recognised. An official document published in 1855 ought, under any circumstances, to have comprised the latest information upon the subject it professed to elucidate. In this particular instance it would have been the easier, and certainly more desirable, to have comprehended the most recent replies to the questions proposed, because the letter to Lord Palmerston was published on the 15th of June this year, subsequently to the publication of the return moved for by Mr. Wilkinson of the number of prosecutions instituted under the powers of the act of 1848. Possibly, the imperfect nature of the evidence contained in the "Letter" was not the effect of chance. It would seem to have been adopted purposely to throw upon the manufacturers who have been fined, the accusation of an obstinate refusal to examine the evidence upon the question of the consumption of smoke.

The "romantic" character of the letter is, however, mainly to be found in the portions which affect to treat of the scientific questions involved, and particularly in the so-called conclusions from the evidence obtained. The first of these conclusions is a self-evident fact, and it was hardly worth the while of our Government to set to work the useless and expensive machinery of a small commission to discover that the emission of smoke is a proof of imperfect combustion, and of a consequent waste of fuel. The second conclusion is so badly worded, that it is hard to arrive at any clear idea of what is meant by it. If, however, it be intended to assert that the fuel wasted passes off in the form of visible smoke, and also "in the form of gas —both common coal gas (*i.e.*, carburetted hydrogen) and that called carbonic oxide"—we would observe that the assertion is partially true, but that the inferences drawn from it are "romantic," in the sense we endeavour to attach to the word. There does exist in the visible smoke, and in the invisible gases which escape from ordinary chimneys, some carburetted hydrogen; but the usual construction of furnaces does not warrant the belief that much of that gas can escape freely from the shafts. As to the escape of carbonic oxide, the very precautions recommended for the suppression of smoke must tend to increase the quantity evolved, because their efficacy consists mainly in the increased quantity of oxygen they present during combustion; indeed, it is probable that so much oxygen may be introduced as under some circumstances to give rise to the evolution of carbonic acid gas, which would be far more deleterious, in a hygienic point of view, than the distribution of the unburnt carbon in the form of visible smoke. The most perfect combustion cannot annihilate any portion of matter; it may convert the coal—the source of carbon—into invisible gases; but we have yet to learn what are the precise changes which will in practice be superinducted, and what will be their effects. From all that we at present know, we are justified in asserting that the quantity of carbonic oxide given off will be greater when no visible smoke is emitted than in furnaces managed in the ordinary way; and that, if *that* circumstance be considered as indicating a waste of fuel, manufacturers will gain little by the change. The third conclusion is substantially correct; but it was long and universally known. It appears, however, to have been introduced for the purpose of covering the unmeaning attack in a subsequent clause upon furnace-builders, on the score of empiricism. That the Board of Health, which has played such fearfully fantastic tricks all over England, and wasted such immense sums of money on its own empirical ideas of pipe-drains, gathering grounds, sewerage manure, soft water, burial schemes, and countless other follies —that this board should have the impudence to charge a body of successful practitioners with empiricism, is not to be wondered at. Quacks at all times abuse the sciences they cannot comprehend, and apply nicknames to those they are desirous of supplanting. But in this particular case it is unfortunate that the board should assert that the "manufacturers of furnaces are guided by little better than empirical rules," when it is notorious that the subject has been long and carefully studied by the most competent observers, that the perfection of furnaces has been the object of, perhaps, more experiments, and of more patents, than any other detail of manufacturing establishments. Tredgold, Hann, Fairbairn, Prideaux, Williams, Poole, Wicksteed, Hall, Hicks, Maudsleys, nay, nearly all the best engineers, civil as well as mechanical, have, in our own country, striven to elucidate the laws of combustion, and to improve the construction of furnaces. Peclet, Pitôt, De Pambour, and Regnault, in France, have done much to extend our knowledge of the subject; and so far is it from being the fact that the constructors of furnaces are guided by empirical rules, that we assert that every eminent constructor acts upon principles which are founded upon strict philosophical investigations. The public, in general, fortunately appreciates the vague accusations of the Central Board of Health at their proper value. Such shallow, flippant, talkers as Lord Palmerston, however, require pointed nicknames to make their speeches telling; and so the writers of this "Romance," having failed to discover any law as to the principles to be observed in the construction of furnaces, "after the inquiries among persons who have employed inventions for this purpose," find it very convenient to call all those who have preceeded them in the study of the numerous questions involved, "Empirics." And documents of this kind are called scientific! They are appealed to by our legislators!

Mr. T. Taylor is an eminent farce translator, and was once, we believe, a professor of English literature. It is strange, under such circumstances, that he should have allowed such a badly written report to appear under his name. We already called attention to the incorrectness of expression in the second conclusion; in the fifth the same carlessness may be also observed; and we would seriously recommend the Board of Empirics to cause its subordinate writers to attend some school of English composition. In this sentence it is stated that "many persons have succeeded in entirely preventing the escape of visible smoke, *except while first lighting* their furnaces. No doubt, it was meant by this expression to say, "except on the occasions of lighting the furnaces;" for evidently the context of the romance shows that the smoke was given off, not only while *first* lighting the furnace, but upon every subsequent lighting. These are but verbal criticisms, it is true; but really men who are so fond of accusing others of ignorance and empiricism, must expect to be severely, and even minutely, criticised in return.

Lawyers talk occasionally of men proving too much, and the principal allegation of the eighth conclusion may be cited as an illustration of the manner in which the romance writers of the Central Board overstate their cases. It is therein asserted that the adoption of some compulsory legislation upon the consumption of smoke would "protect the national resources from the grievous waste of fuel to the amount of *millions* a year." Without pretending to statistical correctness, we may state that the total production of coal in the United Kingdom is equal to about 40,000,000 tons a year, of which 15,000,000 are required for the iron-works and for exportation, and probably 5,000,000 more for the manufacture of gas. The total quantity upon which the consumption of visible smoke could produce any effect may, therefore, be taken at 20,000,000 tons, of an average value of £15,000,000. Many manufacturers deny that *any* economy is produced by the consumption of smoke; but even from the "comfortable" returns published in the romance under our notice, it does not appear that the average economy can be taken at a higher rate than ten per cent., so that the extent of saving would, even upon the showing of the board, not exceed 1,500,000. But it is to be observed, that even in this case we have taken the most favourable view, because the 20,000,000, assumed to be consumed for ordinary purposes, includes the quantity burnt in private houses, as well as that burnt in furnaces; and we suspect that even Sir B. Hall hardly dares yet to meddle with the construction of Englishmen's hearths; although, now we have allowed him to meddle with our water-closets, there seems to exist little reason why he should stop in his career.

It is important, before the public adopts the idea that the combustion of smoke is a fit subject for legislative interference—

and that it is desirable, in order to secure it, *to nominate a body of constables and inspectors, to be stationed upon the monument, or other similar lofty buildings, to watch the shafts of the various factories*—to ascertain whether it be true that the prevention of visible smoke is really desirable. Many very able authorities flatly deny the assertion that it is so; and, on the contrary, affirm that the superiority of the hygienic conditions of English cities over those of continental states, is partially to be attributed to the action of the minutely divided carbon emitted by the numerous chimneys of our towns. The question was seriously discussed at the meeting of the British Association for the Advancement of Science last year—a fact to which, with its usual skill, the Central Board of Health make no allusion in their report published June 15, 1855. In our opinion, there is sufficient inducement to manufacturers to prevent waste of fuel, to ensure all the practical good which can be effected. The State, in almost all cases, does mischief when it attempts to interfere with the details of life. For instance: numerous medical authorities hold that already the State has done infinite mischief by the laws upon the subject of vaccination. If this be true with respect to a question so long and so conscientiously discussed, ought we not to pause before we allow our rulers to interfere in a matter with respect to which little is really known, and their authorities evidently know less of than any one else? It may be desirable to have a clear atmosphere, but does not the smoke which veils our London sky save us from evils we wot not of? The question is a very important one: it should have been solved before the act of 1853 was passed; it should have been discussed by the self-created scientific authorities of the Board of Health.

Every fable has its moral; every romance its principal point of interest. In the romance we have been considering, the moral, or the point of interest, is to be found in the creation of a new body of smoke inspectors—men appointed to annoy manufacturers, or to receive bribes from them. We commend to the notice of the administrative reformers the conduct of our present police force. What it will become under the patronage of Lord Palmerston and Sir B. Hall, it is hard to say! but at present the smoke-abatement cry appears to be accounted for by the desire to possess the patronage of a new body of domestic spies.

CONTRACTION OF THE PEAT-GAS BUBBLE.

The exposures we have from time to time made of the fallacies of peat-gas projects have, naturally enough, excited the ire of the projectors; and our Paris contemporary, the *Journal de l'Eclairage au Gaz*, who is a staunch advocate of the non-luminous gas, not only dislikes our facts, but takes umbrage at the manner of adducing them. The gloom of peat-gas illumination is considered too lugubrious a subject for pleasantry and badinage; and, after denying for himself and other French writers the imputation of representing matters of fact too much *en couleur de rose*, he endeavours in all sobriety to show that we have not given peat gas its due. There are, however, certain awkward facts, which it is found difficult to deal with; and in the reply that is now made, after three months of cogitation, it is thought desirable to abandon some of the positions that were most prominent points in the project, the occupation of which, indeed, invited our attack. In the first announcements made by the *Journal de l'Eclairage au Gaz*, and by the *Journal des Debats*, it was positively stated that all the objections previously raised to peat gas had been removed "by the experience of facts;" and the lighting of the town of Meaux was vauntingly adduced as proof that peat-gas illumination had become "*un fait accompli*." Our contemporary now, however, admits that peat gas is still in "a state of experimentation;" and, instead of confirming the previous announcement of its realisation, he contents himself with deprecating attacks on a project not yet developed, modestly observing, "it may be admitted without humiliation, that it has not been completely possible, within a few months, to make that progress in the manufacture of peat gas which has been attained by coal gas, after the labour of forty years." The "Journey to Meaux," as related in the March number of our Journal, has evidently caused great annoyance to the peat-gas projectors; and it is insinuated, though not directly affirmed, that the gentlemen who journeyed from Paris to Meaux to witness the effect of peat-gas illumination were doubly hoaxed; and that the light they admired was actually derived from the distillation of peat, and was not, as they were informed at the gas-work, the produce of coal. It is intimated that this deception was practised as a retaliation for the assumed rudeness of intrusion into the premises. There is no other foundation whatever for such a representation than the desire to throw doubt on a disagreeable fact, which it is felt must shake confidence in the statements respecting the present progress and the brilliant future of peat gas.

Our contemporary takes credit to himself for the sobriety of his views, and the correctness of his statements; and declares that the silence he has observed for some months past on this subject would not have been broken, if he had not been led to do so by the desire to set us right. In this attempt to correct our errors, however, he makes admissions which confirm our views; and, unluckily, commits some blunders that sadly invalidate his claim to special accuracy. In alluding to our notice of Sir Robert Kane's analysis of peat, and to the statement of the quantity of naphtha ascertained by Mr. Lewis Thompson to be requisite to carburise non-luminous gas, those two gentlemen are, by our contemporary, incorporated into one—Sir Robert being altogether absorbed by Mr. Thompson, who is made accountable for experiments in which he took no part. The analyses of the constitution of peat undertaken by Sir Robert Kane, by the direction of the Government, were adduced by us in opposition to a statement in the *Memoire sur le Gaz de Tourbe*, on the authority of an anonymous commission, to the effect "that, besides the volatile oils, the peat yields an excess of 25 per cent. of tar for carburetting the gas produced." The average results of Sir R. Kane's experiments on several kinds of peat indicated that 100 parts contain, of volatile oils, 0·790; of fixed oils, 0·550; and of paraffine, 0·134: the proportion of fixed oils being, as we stated, 5½ parts in 1000. Adding the paraffine as a portion of the fixed hydrocarbon constituents, the amount would still be less than 1 per cent., as stated by the "commission of chemists and of competent men." It now appears that the author of the *Memoire* was M. Pelouze; and the *Journal de l'Eclairage au Gaz*, in announcing his name, thus freely admits the fallacy of his statement, in the same sentence that it mistakes Mr. Thompson for Sir Robert Kane:—"M. Pelouze has published, *wrongly, it is true*, that there was obtained from 20 to 25 per cent. of oil in 100 kilogrammes of distilled peat; but, notwithstanding the profound esteem that we have for the science of Mr. Lewis Thompson, we are forced to declare that he is not more correct in announcing only a produce of 5½ in 1000 kilogrammes." The experiments carefully conducted by Sir R. Kane varied much in their results, according to the quality of the peat operated on; but the largest proportion of fixed and volatile oils combined did not, in any specimen, much exceed two per cent.

The known constituents of peat render it extremely improbable that the hydro-carbons it contains can impart luminosity to so large a quantity of gas as that stated to be produced by its distillation. There is no doubt that peat gas can be made sufficiently luminous; but the important question is, can gas of the same quality be made as cheaply from peat as from coal? It is of no avail to bring forward the evidence of chemists to prove the excellence of peat gas, unless evidence be at the same time produced of its cost. Neither practically nor experimentally has it yet been shown that peat gas, proper for illumination, can be made as economically as coal gas; and, until that be proved, it can never be usefully employed for lighting towns.

Our notices of the endeavours making in France to inflate the peat-gas bubble have had the effect, we are glad to perceive, of altering the tone of its supporters, who have themselves to blame for challenging the exposure of the project by their arrogant assertions of complete practical success, and by exaggerated representations, which are now admitted to be contrary to fact.

SIR B. HALL'S SANITARY LEGISLATION.

There appears to be every reason for believing that the attempts made by the former leader of the "dirty party" to extend the power and influence of the Central Board of Health will be defeated for the present session. After frequent delays, the bills upon the subjects of the Public Health and the Removal of Nuisances have been brought before the legislature at so late a period, that there is little probability of their being passed through the House of Commons in time to allow of their being referred to the House of Lords, in accordance with the standing orders of the latter assembly. The Public Health

Bill is particularly in this equivocal situation; and, indeed, there is upon the notices of motion one for the express purpose of asking Sir B. Hall whether he intends to proceed with that bill at this late period?

Most sincerely do we hope that this will be the case, and most cordially do we congratulate the persons interested in gas and water companies upon their escape from the tender mercies of the great centraliser, Sir B. Hall. Their task is not, however, completed; their vigilance should not be lulled by this temporary success. The patronage of the Central Board of Health is far too essential for the weak and corrupt administration which now misdirects the resources of our country, to induce the belief that so many comfortable places will at once be suppressed; and if the Board of Health continue in any form, the battle of this session must be fought over again. Much of the evil which has been so shamefully inflicted upon, not only the gas and water companies, but upon the ratepayers at large, has arisen from the unresisted manner in which the empirics of the Board of Health have been allowed to obtain possession of the public press. They have repeated their own romances so often, and have so entirely escaped contradiction, that, at length, both the public and the empirics themselves have believed the assertions of the latter to be true. Between this and the next Session, means should be taken to enlighten the public upon the various questions connected with sanitary matters, upon the real principles which should regulate private-bill legislation; and, lastly, though principally, upon the real working of the Public Health Act of 1848. There will next year infallibly be some attempt to introduce the abortive measures of this session, and every means should be taken to lay before the public and the legislature, in a fair and impartial manner, the truth upon the numerous questions involved. Our JOURNAL is necessarily of a rather limited character, and its circulation only takes places amongst a particular class; but we will help the good cause to the best of our abilities. The occasion is vital; and again do we urge gas and water companies to unite their efforts to destroy effectually that most mischievous incubus upon the resources of the country—the Board of Health.

The manufacturers of England owe a lasting debt of gratitude to Mr. Henley, for the plain, practical suggestions he made, and the alterations he obtained in the Nuisances Removal Bill. As altered by him, that measure, although still open to constitutional objections, would, we believe, be found to be very useful. How strange it is that the Tories are always the most really liberal, and the most statesmenlike of our political parties! Heaven defend us from Liberals such as Sir B. Hall, and may we fall under Tories such as Mr. Henley, if all their conduct is to correspond with that they have respectively followed with respect to these two bills!

Communicated Articles.

ON THE COMPOSITION AND MANUFACTURE OF CLAY RETORTS.

Now that the employment of clay retorts in most of the large gas-works has become "*un fait accompli*," it may not be amiss to venture a few remarks upon the composition and construction of these important instruments; not that we regard their greater economy, with respect to iron retorts, as a settled question, since the decision of this is necessarily a work of much time and small prejudice, neither of which conditions have yet been fairly brought to bear upon the subject. Enough, however, is now before us to show that a close rivalry exists as to their respective advantages, and any considerable improvement might speedily turn the balance on either side; but, as the prospect of improvement is evidently greater in the case of clay than of iron retorts, we are the more inclined to agitate the present question at this moment. It has been well observed, that had not some one previously declared the "line of beauty" to consist in a "*straight*" line, Hogarth would probably never have been led to the discovery that it was a "*curve*." The error of simplicity or ignorance occasionally in this way becomes the parent of truthful knowledge, just as, according to Coleridge, "the child is father to the man;" and thus we, more anxious to develope the truth than to create a character for infallibility, venture, without hesitation, to expose the extent of our limited information, in the hope that, if wrong, some "fire-clay" Hogarth may rise in triumph over our ignorance, and give the beautiful finish of perfection to the manufacture of clay retorts.

The first object of importance towards the fabrication of a good clay retort is unquestionably good fire-clay; without this, success is an absolute impossibility; and, although the process of what is called "weathering" has a beneficial action upon most kinds of clay, yet this will never convert an intrinsically bad clay into a good one. Many opinions have been advanced respecting the nature of the change induced in clay by the weathering process, and some have even conjectured that various specific impurities are taken from the clay by its means; but this is certainly an incorrect view of the matter. If the weathering of clay rendered it more pure, then the surface clays of this country, which have been exposed to the weather for centuries, would be the purest, whereas we know that they are exactly the reverse of this. Moreover, clay, from its very nature, is known to resist the action of filtration, by which alone any soluble particles it might contain would be dissolved and washed away, except, indeed, from the mere surface. The probability is, that weathering removes nothing of any consequence, either prejudicial or otherwise; its action is partly mechanical, and partly chemical. The clay is disintegrated, and really reduced to an impalpable state of subdivision by the particles of water which insinuate themselves into the mass; and, by the power of capillary attraction on one hand, and the expansion of freezing on the other, fairly pulverise the clay in a manner almost impracticable with even the most powerful machinery. As a consequence, too, of this extreme subdivision and enlargement of surface contact, the silicate of alumina is enabled to combine chemically with its full complement of water, and thus pass into a state of perfect hydration; or, in other words, assume a fixed composition and uniform character. The advantage of such a result will be more accurately appreciated as we enter farther into detail; but it may, perhaps, be as well here to remark, that, since all clay requires to be mixed with a considerable portion of burnt clay, or other silicious ingredient, it is obvious that this admixture can never be so accurately proportioned to the natural requirements of the clay as when this, by the action of water, has taken on a state of rest in respect to its chemical and mechanical conditions. The longer, within certain limits, that clay is subjected to the influence of air and moisture, the more plastic it becomes; and, consequently, the larger the proportion of burnt clay or other silicious matter it will require to prevent that excessive contraction which takes place in the subsequent firing of the goods made from it; and exactly in this ratio will the goods so made resist the destructive effect of the contractions and expansions caused by great and sudden changes of temperature. A clay retort may be looked upon as an aggregation of particles or minute fire-bricks, cemented together by fire-clay; and since, in brick-work, it is known that the smaller the bricks the more enduring the edifice, so the smaller the particles the greater the compactness and solidity of the retort. But this diminution in the size of the particles has a limit, dependent in some measure upon the size of the retort or article to be constructed; and it may easily be observed, by a very superficial examination of the various retorts now brought to market, that great difference of opinion prevails amongst the makers themselves in respect to the proper size of these particles. In some retorts they are very small indeed, and difficult to be distinguished from the surrounding clay; whilst in others they stand out in considerable relief upon the surface of a fractured piece, and give a harsh, coarse-grained aspect to the mass. The first kind of retorts afford, when struck with a hammer, a clear sonorous tone, like that of a bell; whereas the latter are dull, or emit only an obscure sound, as if cracked. The advantages and disadvantages of these two kinds of retorts stand in exactly opposite directions—the one being close-grained and homogeneous cracks, if it cracks at all, in large rents or fissures, from which the broken pieces easily dislocate themselves, and fall out with the production of huge holes; the other having at best but an imperfectly adherent constitution, easily splits into a great number of small fissures; but the separated portions of retort thus created, being retained "*in situ*" by the roughness of their edges, do not drop out with the same facility as in the previous instance; consequently the leaks in the former kind require to be immediately attended to, and occur at rare intervals; whilst in the latter they are too numerous, too frequent in occurrence, and for the most part too small to permit of, or to require, any other form of repairs than the gradual obstruction caused by a deposit of carbon from the gas. Under an active and intelligent system of surveillance, the close-grained retort is much to be preferred; but where a "*laisser-faire*" style of management is allowed to prevail, the rough or coarse-grained retort will most probably obtain a preference, in consequence of its faults being capable, to some extent, of self-correction. Nevertheless the manufacture of clay retorts can never be said to have reached perfection until, to the fine and compact structure of the close-grained variety, is joined a freedom from the defect of cracking under considerable variations of heat; nor is there any reason to believe that this is at all an impossible or even improbable contingency. In fact, it has been already accomplished in other kinds of earthenware; much of the Meissen porcelain, for example, which is imported into this country to supply the wants of experimental chemistry, possesses a remarkable power of resisting fracture by great and sudden changes of temperature; thus it is not at all unusual to find capsules and crucibles of this ware, which may be heated to the fusing point of silver, and then rapidly plunged into cold water, without sustaining any injury; though nothing can exceed the compact and almost vitrious nature of their structure.

Reverting to the question of purity in clay, there is a process generally practised, which, if carried on with sufficient care, must

tend very much to ensure, if not purity, at all events uniformity, in composition; this is the process of elutriation or washing. When properly performed, this operation not only ensures the exclusion of silicious grit and pebbles, but also, in some measure, analyses the clay in the order of the specific gravity of its proximate constituents. As generally conducted, its effect is limited merely to the separation of the pebbles and gritty sand which rest in the bed of clay, and which, being specifically much heavier than the hydrated clay, fall to the bottom when the whole is mixed with water to the consistence of thin mud; so that the upper portion being poured or run off into a proper recipient, the stony impurities are left behind. But, by a repetition of this process upon the thus purified clay, it is every way likely that a perfect trisilicate of alumina, or pure china clay, might be extracted from most of the varieties of fire-clay; and, at all events, clays of greater or less purity might be thus obtained, fit for many different purposes. Upon the due weathering and elutriation of fire-clay, much of its good qualities depend, though, as has been before remarked, these processes will not convert bad into good clay. Much stress is laid upon the necessity of freedom from oxide of iron; and, within certain limits, there is no doubt that this is correct as a manufacturing axiom; but it has certainly been over-estimated in this country. No person of any experience can doubt the fire-resisting qualities of the common Hessian crucible; and yet it manifestly contains a very considerable amount of oxide of iron. Moreover, the kaolin sent from China to the Great Exhibition by her Majesty's consular agent at Shanghae, and which is used at the great porcelain works of Kiaing-tiht' Chin, was found, on analysis, to consist of

Silica	62·5
Alumina	32·2
Peroxide of iron	3·64
Oxide of Manganese	·75
Organic matter	·23
Magnesia and loss	·68
	100·

Nevertheless this clay, when mixed with a proper quantity of petuntz or silicious ingredient, is found capable of resisting the enormous heat required for the fusion of the glaze, or "bedaubing-powder," as it is called in the Chinese idiom, and which is known to consist almost entirely of felspar. There is also a strong prejudice against the presence of carbonate of lime; and this appears to rest upon a much better foundation than the preceding, for it is susceptible of positive proof that a comparatively small amount of lime, and even of magnesia, will greatly facilitate the fusion of clay. In short, the reason why our surface clays produce bricks and tiles of a kind unfit to withstand a white heat, seems owing rather to the large quantity of lime which they contain than to the presence of oxide of iron: thus the Windsor brick, which is free from lime, but much contaminated with iron, is found to be a very useful fire-brick. It requires, however, to be borne in mind that there are two oxides of iron; and, whilst one of these—the peroxide—is found to be comparatively harmless, it is possible that the protoxide may possess very opposite qualities: our information on this subject is at present very defective.

Having procured by mixing, weathering, and washing, a pure fire-clay, our next inquiry must be to know what proportion of silicious matter or burnt clay we must employ, so as to counteract the tendancy of the clay to shrink and crack when burnt in the kiln. This is a question which has hitherto been left entirely to experience, and therefore each manufacturer does that which seems right in his own eyes in regard to the relative proportion he employs: some use equal parts of burnt clay and unburnt; the burnt clay being, of course, a residue from previous failures, either in making retorts or fire-bricks, or, it may be, the worn-out crucibles of a glass manufactory, or even worn-out retorts themselves: others employ various fanciful proportions, such as 5 to 4, or 3 to 2 of the same ingredients; and, as has been before indicated, the burnt clay is used in various states of fineness, as regards its mechanical condition. The best Hessian crucibles, which are made at Gross-Almerode, in Hessia, and are celebrated for their high refractory powers, consist, it is said, of equal parts of the fire-clay of that district, in a burnt and unburnt state: the burnt clay is coarsely powdered and separated by sieves, into particles of a tolerably uniform size, which are intimately mixed with the clay and moistened, after which the mass is beaten every day for several hours and again moistened with water, during a period of at least three weeks, though the longer this operation is continued the better the mixture becomes; it is then made into the crucibles which we see imported in such quantities into this country. Those of our retort-makers who employ equal quantities of ingredients, have therefore good authority for such proportions; but it does not appear that any care is taken to ensure uniformity of size in the particles of burnt clay; and herein, perhaps, lies a defect. In cases of doubt, it is always safe to consult the indications of Nature, and gather a lesson from her experience, which in the present instance may be done by examining the mineral substance known as "fire-stone." Here we find the particles of silica composing this substance of great uniformity in point of size, and the exact dimensions of these particles are not unworthy of our careful attention, if we intend to make good gas retorts; but at all events we find here a degree of uniformity which we may look for in vain in any gas retort of the present day; and yet how can uniform contraction and expansion take place in a substance which is composed of large and small pieces, stuck together in a confused and unequal manner? Such a compound would no more offer uniform resistance to an assailing force, than a chain constructed of large and small links would uniformly sustain a given amount of tension. Let those who desire to improve, practically, the making of fire-goods begin by holding half an hour's conversation with a "fire-stone."

Hitherto we have spoken only of burnt clay as the substance, which, being admixed with plastic clay, takes on that character assumed by common bricks or stones in the erection of an edifice; but there is another, and perhaps even a better, material. Few who have had any experience in such matters can fail to have recognised the acknowledged power of the plumbago or blacklead crucible in resisting sudden changes of heat; practically speaking, it never cracks under the most violent and rapid alternations of temperature. Can we learn nothing from this? Blacklead crucibles are composed of from 3 to 4 parts of finely powdered plumbago and one of fire-clay, well mixed together, and beaten into a mass with water. Now, plumbago is an expensive article; but the carbon which collects in the upper part of a gas-retort, and is so serious an annoyance to the gasmaker, is really one form or kind of plumbago, and in all probability would answer the purpose of the retort-maker better than plumbago itself, provided he knew how to use it. Well-burnt coke also approaches in its nature to plumbago, and deserves a trial. To be useful, these forms of carbon must be first reduced to a state of powder, and intimately mixed with clay; after which burnt clay may be added in any desired proportion. Perhaps a good mixture might result from mingling together three parts of finely pulverised carbon, five of unburt and three of burnt clay, the whole being worked and moistened in the usual manner. The introduction of carbon would certainly tend to diminish the liability to crack, without materially altering the compactness of the retort.

Thus far we have travelled upon a comparatively solid and tangible basis, on which the light of science has previously shone with greater or lesser intensity; but we now pass into the unknown, the unaccountable, and mystical. Having secured a good mixture, and treated this "*secundum artem*," until it has assumed the most satisfactory state of plasticity, we might conclude that our labours were over, and that nothing remained but to make our retorts as fast as we could by the most available and powerful means, The aid of machinery would naturally suggest itself, with moulds, forms, plungers, and the other *et cetera* of a regular steam-engine apparatus. In our mind's eye we can fancy the whole at work, like the interminable operations of a cotton-mill, or a steel-pen manufactory. Here the clay goes in, there the retorts come out, at the rate of so many per minute, to the amazement of the almost incredulous beholder. Stop! stop! gentle reader, and let us come to an understanding at once. Machinery is of no avail here; the human *hand* and the human *foot* alone can help us in this instance; the clay must be trodden with the human foot, and the retort fashioned with the human hand, if we seek perfection. The pug-mill is a very indifferent substitute for the first, and we have as yet no substitute at all for the second. Experience has shown, that if two portions of the same mass of prepared clay be made into a crucible or retort—in one case by the hand, and in the other by a mould, with machinery—the machine-made article will be a total failure; it will crack, and fly to pieces, under identically similar circumstances to those which the hand-made article will sustain without the slightest injury. This strange fact has been proved over and over again, both in this and other countries, more especially with respect to glass-house pots or crucibles, and the crucibles employed in the fusion of cast-steel. The cause of so unaccountable a circumstance remains, and seems likely to remain, a mystery; yet this is the very point where improvement would most speedily and surely attain its reward — the very fulcrum on which the lever of economy turns—for the intrinsic value of a retort is small compared with the cost of the human labour invested in its production; and he who shall be the first to substitute with effect the agency of steam for that of human beings, may easily reap a fortune before his competitors have time to deliberate upon the expediency of the change. And, be it remembered, there is no difficulty in devising suitable machinery to produce, mechanically at least, the desired effect: on the contrary, such machinery has been already devised, constructed, and put in action, but without success as to its results. In working up the mixture known to produce by the hand a good retort under the usual system, machinery has always produced a bad one. Hence many persons have concluded that human manipulation imparts a specific power to the clay with which it comes in contact, but it seems more probable that its action may be accounted for in a more lucid manner, by conceiving that it really serves to disconnect the various pieces of clay which compose the retort; whereas the pressure of machinery renders the mass more solid. Thus, in fashioning a retort by hand, the portions of clay must be applied at different periods of time; by which it necessarily follows that the portions first employed lose on their outer surface much of the water combined with them; and, therefore, when an additional piece of moist clay is applied, this does not unite perfectly

with the half-dried surface of its predecessor; consequently, a kind of loose joint is formed at the place of union, and thus the retort becomes, in fact, a series of detached or unequally cohering masses, like a piece of brickwork; and the more slowly the retort is built, and the dryer the air during the process of construction, the more perfect will this peculiar effect be manifested; so that, under very favourable circumstances, something almost like elasticity may be produced.

If, however, such be a correct view of the effect of manipulation, nothing would be easier than to impart this quality to retorts made by machinery: all that we need do would be to produce between the various portions of clay intended to be made into a retort the same kind of disconnection which ensues from the drying process above alluded to. Thus the mass of clay might be cut into pieces, and allowed to remain exposed for some days to the open air; or they might be immediately dusted over with well-dried clay; and, after one or other of these operations, the whole might be subjected to the action of machinery, so as to make a retort possessing (in theory at least) the peculiar structure of the hand-made retort.

The burning or firing of retorts, so as to fit them for the market, is a subject scarcely within the province of this article, except, indeed, it is necessary to remark that the heat employed in firing ought always to be greater than that to which they are afterwards subjected in a gas-works; without this, the subsequent shrinking of the clay may become troublesome; and if the two ends of the retort are firmly held in by the brick-work a fracture must ensue, upon the principle first noticed by Wedgwood, and employed in the construction of his pyrometers. Again, the fire or furnace of the kiln ought not to be too near to the retorts, as the ferruginous ash of the coal is then carried to the surface of the retorts, where it adheres by subsequent fusion, and gives a red, offensive hue that detracts much from the appearance of the article; for the same reason, good coals ought to be used in firing.

Of late, some retorts have been employed with a glazed or smooth inside; and, although experience has not yet had time to pronounce decidedly in their favour, still the few results now arrived at are said to be perfectly satisfactory. These results tend to show, as, indeed, science would seem to indicate, that there is less disposition to accumulate carbon in the interior of the glazed retorts than in those of a rough and uneven surface. The same thing is known to occur with regard to the carbonate of lime, which deposits on articles placed in a petrifying spring: the roughest are soonest coated.

Correspondence.

GASFITTERS' ASSOCIATIONS.

Sir,—It seems pretty generally understood now, in the gasfitting trade, that "*Association*" is a dead letter, either from want of combination, or from something else. The gas exhibition at the Polytechnic, in 1851, was to do wonders for the trade; but I have never yet heard of any one that benefited by it. Although it was to last only six months, three years passed away before any account was rendered to the subscribers. Another society, called the Gasfitters' Mutual Association, started in 1850, about a year before the affair at the Polytechnic, which seemed at first, under the influence of good lectures, delivered by able men, to be going the right road; when the Polytechnic matter sprung up, and the actors in the "*mutual job*" sunk out of sight, just like the demons drop through the stage in a Victoria pantomime! Nearly four years passed away; and, although my friends say I have a good memory, I had quite forgot the matter till, about two or three months ago, I received a notice from the secretary to attend a meeting, and was informed there was a balance in hand. I could not attend the meeting; but I have found by inquiry that nothing has yet been done, and have, of course, been waiting another summons. If anything is to be done, it ought to be done now in the summer, when our trade is slack, and not just thought about in winter, when we are engaged in something more useful—*our business*.

Thinking of these things reminded me that I subscribed, about ten years ago, to some society that was got up in a tremenduous hurry to oppose the London Gas Company at Vauxhall, when they were very snugly trying to push a bill through Parliament, to give them the power of selling gas-fittings, and doing gas-fittings, and the like.

The bill was stopped; and here *combination* did some good; but I never heard how the money was spent. More money could not have been wanted, or the subscribers would soon have had an application. Perhaps, Mr. Editor, some of your very numerous readers could tell me who were the actors in that affair, and whether any account was ever rendered.

I don't understand this groping work. Money matters ought to be as clear as the electric light. I have subscribed to all the three things, and am dissatisfied with the lot. In fact, it seems the old story, "Fools and their money are soon parted."

June 26, 1855. A Benighted Gasfitter.

Sir,—As one of your constant readers, I should thank you for a corner in your Journal, to enable me to ask of my brother tradesmen whether a society is still in existence to which I subscribed six or seven, or may be, eight years ago, and which, I believe, was got up to prevent an intended monopoly on the part of the London Gas Company, when they wanted to destroy my trade by adding to their own. They sent a bill into the House to enable them to sell fittings; but the trade met and put it down. I never heard whether the society did, or attempted to do, any good beyond that, and should be glad to know, as well as how the money was spent.

Southwark, July 2, 1855. A Fitter.

THE PLATINUM LIGHT.

Sir,—M. Gillard cannot claim the platinum light as either his invention or his discovery. Credit may be due to him for an attempt at its practical application as an illuminator; but the discovery is due to Sir Humphrey Davy, who, in a paper laid before the Royal Society in 1817, on "The Combustion of Gaseous Mixtures," says:—"I introduced into a wire-gauze safety-lamp a small cage, made of fine wire of platinum, of the $\frac{1}{10}$th of an inch in thickness, and fixed it, by means of a thick wire of platinum, about 2 in. above the wick, which was lighted. I placed the whole apparatus in a large receiver, in which, by the means of a gasholder, the air could be contaminated to any extent with coal gas. As soon as there was a slight mixture of coal gas, the platinum became ignited; the ignition continued to increase till the flame of the wick was extinguished. At the moment of extinction, the cage of platinum became white hot, and presented a most brilliant light."

Sir Humphrey concludes his paper by observing, that he had sent some of his safety-lamps to the coal-mines of Newcastle, hoping that in the event of the oil-wick flame inside being extinguished by fire-damp, the incandescence of the platinum would be kept up by the fire-damp *itself*, and thus be a means of affording the miners a light. M. Gillard did not require to cultivate science long to produce the light which bears his name. It was Sir Humphrey Davy who *cultivated;* M. Gillard *reaped the fruit* of that cultivation. The light given by this burner depends, as a matter of course, upon the intensity of heat communicated to the platinum; and this heat can only be attained by a vast consumption of hydrogen.

The reason why platinum gives light by getting to that high state of incandescence, is due to its very low conducting powers. Thus, the heat produced by the combustion of the hydrogen is concentrated upon the coil or bulb of fine platinum wire; and, unlike any other metal which would *carry off* this heat to such an extent as to prevent its getting to that white heat necessary to give light, the platinum *retains* it; hence the light it gives.

It surely cannot require much to convince men that this must be a very expensive way of obtaining light, compared with coal gas; for, from gas obtained from coal, and other substances rich in carbon, the light-giving property is held in suspension in the hydrogen; and the moment the latter is ignited, the infinitesimal particles of carbon, as they are forced through the burner, remain suspended just long enough for the hydrogen to make them white hot; indeed, *as the amount of these particles of carbon held in suspension in any coal gas, so is its illuminating power.* It follows, then, that, as in the case of the Gillard, or perhaps, more properly speaking, the "Davy" light, so in that of coal gas; BOTH owe their light-giving properties to the incandescence of solid matter; and everybody knows that the thicker a bar of iron is, the more it takes to heat it. So in the case of the platinum light; no matter how fine the wire may be of which it is composed, it still is infinitely short of that minute subdivision as that of the carbon in coal gas. The platinum must, consequently, take a vast amount more fuel (*i.e.*, hydrogen) to make it incandescent; and as such will necessarily, as your article in last month's Journal says, be a far more expensive light than ordinary coal gas.

St. Neot's, Huntingdonshire, June 20, 1855. Geo. Bower.

SANITARY PROPERTIES OF COAL TAR.

Sir,—My former communications, relative to the properties of gas tar, naphtha, &c., appear to me to form a connecting link with the important communication addressed to you by Mr. Lewis Thompson, "On the probable origin of malaria," &c., inasmuch as in them were embodied the following observations:—

That gas tar, when put into cesspools and drains, prevented putrefaction, neutralised the noxious gases emanating from sewage, and in a vitiated atmosphere gave out those volatile properties advantageous to health.

That gas tar, when made into an asphalt, owing to the naphtha contained in it, destroyed putrative matters, and acted as a preventive of cholera, as in the case of the "pitch lake" at Trinidad, where the poor population of that district in the island alone escaped the disease. The curative virtue of wood naphtha, in Asiatic cholera, having been also verified by Dr. Andreosky, physician to the Commander-in-Chief of the Russian Army.

That gas, when burnt in houses during cholera visitation, neutralised the "ozonetic" condition of the air, and restored it to a more healthy state; the poor, who possessed not the advantages of its sanitary influences, being on that account more liable to be attacked.

That gas, during the period of cholera and other epidemic influences, when allowed to escape unconsumed at night into the compartments in the Kingston flax and cotton mills at Hull, decreased sickness, and conduced to the health of nearly 1000 work-people employed there.

Lastly, that the men employed at gas-works, where carburetted hydrogen gas was always being produced by the distillation of coal, were exempt from cholera.

Such were the views promulgated by me, and which now appear from the experiments of Mr. Thompson to have some weight in them. What effect different gases may have, when passed through the condensed water, in hastening or retarding the growth of infusorial and confervous plants, perhaps Mr. Thompson will point out hereafter.

The soil taken out of the streets in which the paving-stones are laid, would, in my opinion, if analysed, be found to contain organic impurities, which, by the variations of rain and heat, give out gases pernicious to health. The filling in of the joints of granite with shingle and coal tar prevents the accumulation of those impurities, and as they cannot penetrate into the soil, they are washed away from the surface of the streets into the drains, and the air becomes purer and sweeter.

Weak and consumptive people, when employed in woollen manufactories where much oil is used, and their clothes are saturated with it, become robust and healthy. May not the hydro-carbons of the oil in this case retard the growth of "infusoriæ," &c., and purify the air? Some of your readers may know from personal observations the state of the health of the people employed in coal mines, where there is always more or less of carburetted hydrogen gas mixed with the air which they breathe. I am inclined to think, from analogy, that they are nearly free from epidemic diseases. Humboldt states that, according to the analysis of Dumas and Boussingault, a volume of dry air contains 20·8 oxygen, 79·2 nitrogen, and beside from two to five thousand carbonic acid, a still smaller quantity of *carburetted hydrogen*.

The officers and men last year employed in the steam vessels of the navy suffered more from cholera than those employed in the sailing vessels. May not the moisture and heat arising from the engine-room of the steamers have, in the above instance, hastened the growth of "infusoriæ" and "confervæ," which from Mr. Thompson's experiments ever seem to be found where large bodies of people are assembled, and confined to a limited space to breathe in? Whatever lowers the standard of health, favours the attack of disease; and it is is a remarkable fact, that wherever cholera has raged amongst us, it has been found that the air is strongly charged with ozone. Humboldt expresses his hope that pains will be taken to make the observations efficient, as to whether the increase or diminution of ozone at Paris and Lyons has something to do with the rise and fall of epidemics, so much importance does he attach to the result.

Dr. Reed remarks that, "in cases of cholera, the colour of the blood becomes dark; sometimes it acquires the consistence of tar, and is readily affected by the oxygen of the air. It loses much water and most of its saline matter, the proportion of *albumen* being increased. Its density is greater, and does not coagulate."

In vegetation, I find from experience, antiseptic (hydro-carbon) manures, gas tar, &c., destroy malaria, and thereby prevent disease; whilst putrescent (nitrogenous) manures favour unhealthy growth of plants, and render them liable to disease. I consider all putrescent matters act on plants, as well as on individuals, in inducing disease, and unfit them to withstand the changes of the atmosphere, hastening the growth of animalcula and fungi, which feed upon the products of decay. I think they have also a tendency to exert a noxious influence on the juices of plants, the produce from them when taken as food not being so nourishing or healthy as the produce from antiseptic manures. I have fully proved, from experiments, no matter what quantity of farm-yard manure or putrescent matters amassed together, which give off offensive gases, &c., prejudicial to health during decomposition, are rendered innocuous, as well as inodorous so soon as gas tar is poured or mixed with them. The disagreeable and unpleasant smell experienced in zoological gardens, from the number of wild beasts kept there, could at once be removed by the use of gas tar, if put in the places where they are kept. It is my firm conviction, that were Government to send out to the Crimea and hospitals a few hundred barrels of coal tar, it would be found to destroy malaria, and act as a preventive of cholera wherever it was spread over decomposing matters. During the visitation of epidemic diseases, the burning of coal-tar barrels in streets, &c., has been found most beneficial to health—in the purification of the atmosphere, by neutralising offensive matters, and correcting malaria.

"Investigator," a correspondent of the *Times*, "on the fungoid theory," states: "Only those who have closely studied these fungi can be aware how very minute, and yet how systematically formed, they are. I have preparations by me of a dozen different species, taken from the grape, potato, parsnip, bean, cucumber, cineraria, veronica, &c., many of which I have had in fluid more than a year; they retain their form as perfectly as if I had only taken them from the plant this very day. No two are alike in form; but all are alike in this—under the very high powers of the microscope they show an external hyaline case, with a second utricle, or inner case, full of minute spores.

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"It will, I think, not surprise any one granting me this much, to be further told that I have caught these fungi in actual transit from one locality to another—not carried about in rotting haulm, but floating in the air. The manner in which I now conduct this process somewhat varies from that I have in a former letter given in your columns. I take a piece of glass six inches square, clean it most thoroughly, washing it with distilled water; I carry it to a field, in which, by a very simple apparatus, I can elevate it some ten feet from the ground. On the spot I smear it over with pure glycerine, and then at once place it *in situ*—if there is any wind, with the surface exposed to the quarter from which it blows. I leave it thus—say, for twelve hours. On taking it down, it should be kept covered until, with a broad camel's-hair brush, it can be washed into a previously cleaned glass with distilled water—just water enough to go over the surface: a teaspoonful is quite enough. The next step is to take a drop of the fluid from the glass, and submit it, between two plates of the thinnest glass, to the highest powers of the microscope. In my own case, the result ever is to give me a great many fungi, of a character so distinct as not to admit of question that they are such; many known to me, but very many of forms not common to the fungi of any of our common garden plants or fruits.

* * * * * *

"A sewer, a crowded burial-ground, the walls and floors and bedding of crowded apartments, dirty water-butts—all these may generate certain specific fungi; for months or years they may lie dormant in all their beds of nastiness; a little extra heat, or the continuance for a long period of a certain amount of heat—any of the numberless effects we know atmosphere has on life of all kinds—may rouse them, and then they only want the meeting with the fitting state of animal life—that for which they have a direct poisonous affinity—and their work of destruction commences. I cannot say whether microscopic investigation may yet be made available to test the air, for such fungi as it emanates in all its corrupted condition from these supposed sources of malaria, but such investigation I think most desirable."

Holmpton-lodge, June 28, 1855. JOHN MALAM.

Legal Intelligence.

COURT OF EXCHEQUER.

TUESDAY, JULY 3.

(Sittings at *Nisi Prius*, before Chief Baron POLLOCK and a Special Jury, at Guildhall.)

BOOTH V. T. KENNARD.

This was an action for the infringement of two patents for improvements in the manufacture of gas.

Mr. WATSON, Q.C., Mr. WEBSTER, and Mr. MACNAMARA appeared for the plaintiff; Sir F. THESIGER, Mr. HINDMARCH, and Mr. J. BROWN appeared for the defendant.

The plaintiff, Mr. G. R. Booth, is a practical chemist, who for some years has turned his attention to improvements for the prevention of smoke, the generation of heat, and the manufacture of gas. The first patent under which he claimed in this action was taken out in 1850, and was for an improved apparatus to be applied to the manufacture of gas from oil. Its novelty consisted in suspending the retort by the neck in a "heat chamber," and in making the interior of the retort an inclined plane in steps, or corrugated. By this means a greater heating surface and a more equable heat were obtained than under the old system, whereby the oil was dropped on to stones or brick-ends placed at the bottom of the retort, which, instead of being suspended in the midst of fire, rested upon brickwork. The second patent was taken out in 1851, and involved a claim for making gas direct from oleaginous seeds, and other vegetable substances, instead of first extracting the oil, and then making gas therefrom. According to the plaintiff, gas thus made was purer and better than any other; and it possessed this advantage, that every housekeeper and farmer growing rapeseed could be their own gasmakers, by means of a portable apparatus. The defendant, Mr. Thos. Kennard, is a civil engineer, residing in Duke-street, Adelphi; and the plaintiff alleged that he, carrying on business under the name of the British and Foreign Vegetable Gas Company, had infringed his patents, by making and selling an apparatus and materials for the purpose of making gas direct from seeds, the retort in such apparatus being suspended in the same manner as under the plaintiff's first patent. Before, however, evidence of such infringement had been given,

His LORDSHIP expressed an opinion to the effect that the second patent was void, inasmuch as the plaintiff thereby claimed for making gas direct from seeds by any process whatever. This, his Lordship said, was fettering skill and genius for 14 years, although a more simple process might be invented.

The plaintiff's counsel thereupon tendered a bill of exceptions to the ruling of the learned judge, so as to have the opinion of the Court of Error upon it.

The verdict was thereupon taken for the defendant as to the second patent, subject to the bill of exceptions; and, as to the first patent, the jury was discharged from giving any verdict by consent of the parties.

SURREY CONSUMERS' GAS COMPANY AND DEPTFORD GAS LIGHT AND COKE COMPANY.

(*Continued from page* 137.)

SECOND DAY, APRIL 13.

William Forrester Bray examined by Mr. BOVILL.

Is an auctioneer, surveyor, and valuer. Carries on business in Holborn. Has been so engaged about 23 years—15 of them on his own account. Was principally engaged in valuing land and houses.

Was employed in 1850 by Mr. Harrison, solicitor, to value these works in reference to a mortgage, in which affair Mr. Harrison was concerned for the morgagee. Made a careful survey for the purpose of ascertaining the marketable value. Thought the annual value of those works to be £1520 per annum. Returned the full value at £25,080. Reported this valuation at that time to Mr. Harrison, as instructed. Has been recently called on by the solicitor of the company to make a fresh valuation of the works. For that purpose, went upon the premises and obtained all the particulars. Found them in a somewhat better state than they were in 1850. Did not see any reason for altering the former valuation. Thought the improvements were a set-off against any depreciation that had arisen. Does not think 10 per cent. would be too much. It is a customary thing when property changes hands.

The UMPIRE: That is mere matter of opinion.

To Mr. BOVILL: Have taken it at 16½ years' purchase.

Cross-examined by Mr. CREASY.

The amount of the intended mortgage was £4000. Has a memorandum of the transaction. Took the first estimated cost at £20,000. Obtained his information from Messrs. Atkins and Andrew, the solicitors of the company at that time, from the books and what he had seen, and the inquiries he made on the premises. The survey of the works took half a day. Satisfied myself, as far as human judgment could go, that there was value for the £4000. The mortgage usually on leasehold is about two-thirds. Generally lend more on freehold. Looking for a mortgage, looked to what the value of the property was then, as also what it might be made by alteration of ground-rents, or otherwise. Put down the value at £1500. Thinks it worth more if divided into ground-rents, but was content to put it down at that figure. Valued the "mains and meters" at £1600. Arrived at that estimate from information received from the same service—not from personal inspection. If he had to rely entirely on his own judgment, would have employed an engineer for assistance.

Witness (to the UMPIRE): Took the mains and meters from information.

Witness (to Mr. HAWKSLEY): Sees by the memorandum the mains are put at £700; the metres at £900.

Witness (to Mr. CREASY): The purchaser of this would be entitled to 6½ per cent. on lease; capitalists are satisfied with so low a per centage on freehold property. Valued this property as for the purpose of carrying on trade, and what it would sell for. His object in making the valuation was to see whether his client would be safe in lending £4000.

Witness (to Mr. HAWKSLEY): This is not a trade valuation; it is an investor's valuation.

Mr. CREASY: You had got some other figures in your calculation the other day. Let me see that, will you?

The witness handed a paper to Mr. Creasy.

Witness: Thinks it would be fair to assume that, if his friend foreclosed, he would have to carry on the business. He would not carry it on long if he had to take possession. Never personally let any business of this kind. Never engaged in leasing anything of the kind. Was informed by Mr. Sandom that there was a right of Mr. Hills adjoining the premises, or, rather, an assumed right, for the use of the dock. Knew nothing of the kind on the first valuation. Had not been told anything to lead him to suppose that the dock did not belong to the company. It was not pointed out to him that the triangular bit of land was part of the property. Had no information, nor had he a recollection that it was said that any right of way along down by the wall was claimed. Believes the valuation was made on the hypothesis that the whole of this was the property of his clients. Thinks Mr. Hills at that time was in possession of the adjoining premises. Does not know that he was one of the directors of the company.

Mr. SANDOM: Mr. Hills came in in 1853.

Witness (to Mr. CREASY): Did not observe a large floating tank occupy a part of that dock that was there. Can only recollect the gasometers on the plain. Cannot state anything about the engineering department when he made his revaluation the other day. Did not rest on the supposition that the dock exclusively belonged to the property. Was informed by Mr. Sandom that there was a supposed right to the use of it. Valued it as exclusively belonging to the company, there being no passing or repassing. Had no information regarding the first survey. Was informed of it the second survey. Did not think it important enough to make any deduction. The triangular piece I did not notice in respect to the valuation.

The UMPIRE: The question is the present valuation as regards these. I can certainly take this evidence, that he knew of Hills' right when he made his present valuation; but, as regards the right of way, he considered there was no right.

Witness (to Mr. CREASY): Did not know that Mr. Hills claimed a right to the dock, and made no abatement, because he thought that claim of no importance.

Witness (to the UMPIRE): Did not make that answer with reference to the land, but as regards Mr. Hills' right to the dock. Did not think his right so important as to abate from the £1500. Excluded that piece of angular ground.

Witness (to Mr. CREASY): It might make a material difference to such property as this, whether there is an exclusive right to the dock, or whether there is a share with anybody else. Did not notice that nearly one-half the dock is occupied by a floating tank. There appeared to be ample room for bringing up vessels, which were represented to me as belonging to it. Did not notice whether the floating tank was there or not. Saw nothing when he was down there. Was there on the 8th of April. Was there in the daylight. Thinks he should have seen the tank had it been there. Relied on the instructions given to him with regard to the trading accounts and the debts. If there had not been a dock, coals could have been got for the business by waggons, without doubt. The use of the dock was of infinite importance to the company in their business.

The UMPIRE: If there is no water access, coals must come overland?—*Witness*: Yes; and that must be attended with great expense to this business.

Witness (to Mr. CREASY): It would be a diminution of the value if prevented from building right up to the wall, because of a right of way that was pointed out to me to be freehold; and I believe it to be so, without any right to narrow it.

Re-examined by Mr. BOVILL.

Witness: Obtained the information about what the land cost in 1850. It cost £1500. Considered it of more value. It might be turned to other accounts independently of gas-works. It is a plot of land adapted to building purposes for works, factories, wharves. Land has improved very much in value in the neighbourhood of Deptford, Greenwich, and Peckham, and all round there, and still continues to improve. Thinks in small trades the personal skill and labour of the trader enter very much into the success of his business, for which he is remunerated by the large per centage of profits.

Mr. Barnard recalled.

Mr. CREASY: Mr. Barnard was to give us a schedule of dead mains yesterday.—*Witness*: Gave a statement yesterday of what he believed to be dead mains. There are no other mains than what were mentioned. There is a main, he finds, that he had not put down.

Witness (to UMPIRE): Had not taken a schedule to put a cross to those that were dead.

Mr. *John Hall* examined by Mr. BOVILL.

Is clerk to Messrs. Jones and Co., accountants, City. Has made a profit-and-loss account for the different years since 1844. The profit for the year ending 31st March,

		£	s.	d.
1845	was	1322	8	11
1846	,,	1405	15	9
1847	,,	1930	15	2
1848	,,	2124	3	10
1849	,,	2112	13	4
1850	,,	1881	5	5
1851	,,	1638	0	6
1852	,,	1249	2	1

In 1853, there was a loss of £2114. 5s. 9d. The loss here, in reality, is from the 31st March, 1852, up to 31st December, 1853; that is, one year and nine months.

Mr. BOVILL proposed to the gentleman on the other side, if he thought the sheet wanted reform, the accountant and he could go through it together; and having made the necessary alterations, if it required any, then hand it in.

Witness: From March, 1853, to December, 1853, is the only year that had been made up. There were arrears that ought to have been entered previously, and which are closed up in that year, that ought to have been charged in former years.

Witness (to UMPIRE): They were open accounts, that ought to have been closed.

Mr. *T. G. Barlow's* cross-examination continued.

Mr. LOGIE: Mr. Barlow, about the answer you gave to me when you were asked the fair structural value of the Deptford Company's mains, services, and so on, was, that they amounted to £19,514 and odd?—Yes.

You have a copy in your hand?—You first asked me whether I had made a structural estimate, and then you asked me the total, and I stated it.

[A copy of the following estimate was handed in.]

DEPTFORD GAS WORKS, 1855.

ESTIMATE OF STRUCTURAL VALUE.

Land.			
3400 yards superficial of freehold land, with water-side frontage, on Deptford Creek and Dock, at 30s. per yard superficial, or 30 years' purchase on a rent of £170 per annum	£5,100	0	0
Buildings.			
Boundary-walls and entrance-gates	150	0	0
Substantially built retort-house, 60 feet by 28 feet 6 inches, with chimney 75 feet high.—Coal store, capable of storing 450 tons of coal	1,300	0	0
Smithy, lime-house, and store	75	0	0
Office buildings	200	0	0
Manufacturing Plant.			
8 beds of 12½ × 12½ × 7. 6 iron retorts set in— 5 beds of 7 retorts each ..35 3 ,, 5 ,, ..15 50 retorts, with mouthpieces, rising-pipes, H-pipes, dip-pipes, and hydraulic main complete	800	0	0
2 wrought-iron condensers, formed of 6 flat pipes, each 28 inches by 6 inches, and 9 feet long, laid at a slight inclination, and connected together with half-circle bends, 10-inch connecting-pipes, and valves	140	0	0
3 cast-iron tar and ammoniacal liquor cisterns, 10 feet diameter by 9 feet deep	210	0	0
2 cast-iron wet-lime purifiers, 10 feet diameter by 3 feet deep, with 9-inch connections and valves	200	3	0
1 cast-iron water cistern, 12 feet diameter by 3 feet deep, supported on cast-iron columns and girders, with discharge-pipes	35	0	0
1 cast-iron lime-mixing cistern, 10 feet diameter by 3 feet deep, with discharge-pipe, &c.	25	0	0
2 cast-iron dry-lime purifiers, 8 feet by 4 feet, by 4 feet deep, with wrought-iron covers and sieves, 6-inch connections and valves	160	0	0
2 cast-iron tanks, 46 feet diameter by 16 feet deep, erected on piled foundations, with 9-inch inlet-pipes and 10-inch outlets, with regulating-valve	2,400	0	0
2 telescope gasholders, 45 feet diameter by 16 feet deep, with cast-iron guide-columns, girders, &c.	1,535	0	0
Water service-pipes, gas-pipes and fittings, pumps, and sundries	250	0	0

Mains.					
123 yards' run, 18-inch laid, at 15s.				£92	15 3
2,282	,,	6	,,	8s.	912 16 0
2,190	,,	5	,,	6s. 5d.	719 7 2
2,625	,,	4	,,	4s. 11d.	645 6 3
12,900	,,	3	,,	3s. 7d.	2,322 0 0
9,787	,,	2	,,	2s. 7d.	1,263 19 9
695	,,	1½	,,	2s.	69 10 0
744	,,	1	,,	1s. 9d.	65 2 0
67	,,	¾	,,	1s. 6d.	5 0 6
					6,067 16 11

Brought forward	£6,067	16	11
Add 5 per cent. for bends, branch, and syphon	306	7	10
	6,374	4	9
Deduct 15 per cent. for depreciation	956	2	9
	5,418	2	0
31,475 yards' run of repairing and repaving roads, at 6d. per yard run	536	17	6
			5,954 19 6

Meters.

10— 2-light	
258— 3 "	
142— 5 "	
51— 10 "	
14— 20 "	
1— 60 "	
1— 80 "	
3—100 "	
1—150 "	
481 meters, valued at 26s. 8d. each, the amount at which they stand in the company's books	626 17 0

Services.

431 services, at 15s.	352	5	0
	£19,514	1	6

My first question is with regard to the land: this estimate includes the land?—It does so.

Your particular branch of business, I apprehend, does not necessarily make you so well acquainted with the structural value as a surveyor?—Of course it does not; I am obliged to be guided in this respect a good deal by the opinion of others.

You have put the value at £5100?—I have put it at 30s. a yard superficial. I estimate it as worth £170 per annum, and I have capitalised that at 30 years' purchase, which makes £5100.

Are you aware that the sum of £1000 was paid for that land by the Railway Company when they bought it?—I am aware that £1500 was paid for the land originally, when it was a mud-bank.

It was purchased by the Greenwich Railway Company at that time?—The Railway Gas Company purchased it from the Railway Company.

At that amount?—Yes, in 1836.

You put it now at £5100?—Yes; with the improvements that have taken place on it, because a dock has been built, and there has been some considerable expense in raising the whole surface.

You do not know it yourself?—I knew the price of land originally.

Was there not water there originally?—There was no dock.

When was that dock built?—That I cannot tell; there was no dock when my father created the tanks there; I knew it in 1836.

When do you first remember having your attention called to the dock?—I have not been on the premises since 1837, till April last year.

What do you take as the probable price of the construction of that dock?—I should think £600 or £700.

What is the length of the dock, do you know? I want the length and the width of the dock at its entrance?—It is on the plan. I should think some 120 feet in length.

You say the price of construction you put at £600 or £700, and must you not allow for a certain extent of brickwork?—I know on the side against the railway there is an expensive retaining wall.

This I am to take as a rough estimate of your opinion as to the value of the land at this present moment?—Entirely so; I know what has been paid by other London gas companies for land not better situated than that.

What induces you to fix on that sum?—I had scarcely given it any attention till you asked the question. I should think that wall could not be constructed for less than £400; that is, the retaining wall on the side of the railways was originally nothing but a mud-bank. I suppose you may go down there for 30 feet, and there is nothing but mud.

Would you say there were more than 15 rods of brickwork in that wall?—I cannot undertake to give any opinion on the subject.

The Umpire: Mr. Sandom, take one of these plans, and make it as you conceive to be accurate, and then hand it in to us.

Mr. Logie: Have you made a detailed examination in order to arrive at your estimate of the retort-house?—No; I have not taken out the quantities; I have exercised my own judgment in forming an estimate, having had considerable experience in these matters.

Can you attempt to form an estimate of the value of a building, any way approaching to accuracy, without you know the quanity of brickwork?—Certainly I can.

The amount of work and the amount of scantling?—Yes.

By what process did you arrive at this sum as to the expenses?—Experience.

It is by guessing by the eye as to the size of the building.

Mr. Bovill: There is 60 feet by 28 feet 6 inches down as the size of the retort-house.

Mr. Logie: Can you explain as to how it is built?—Yes; I saw it built; the lower part of the retort-house is 5 bricks thick; it is an enormously substantial building. For 12 feet high, 3 bricks thick; the upper part was a brick and a half thick.

Would you not have your attention directed to the quantity of work?—I have no necessity to work it out, to form an estimate of what the cost of constructing a building of that sort is.

Do I understand you to tell me that you are not prepared to give me any detail as to the quantity of brick, the quantity of labour, or any other of the items by which you arrive at that result?—I have already told you I did not come here prepared to give evidence on the structural value at all. I prepared myself, in case any question was asked, that I should be able to give some idea on the subject.

You made an estimate?—But not for the purpose of giving evidence upon it.

You answered, as to the structural value, that it was £1300?—Yes, I said I had made an estimate.

Do you mean to represent you did not expect to be questioned on the structural value?—I do not say that.

The Umpire: Mr. Barlow, in his examination in chief, gave us the structural value?—No, it was in cross-examination. I should state that, in valuations of this description, I protest against the structural value being taken into consideration at all, in estimating the commercial value. If you admit the structural value to be the sole criterion of the commercial value, of course a gas-works on Salisbury Plain is of as much value as one built in the City of London.

Do you mean to assert that, in your opinion, the structural value does not form an item in the commercial value?—It does to the extent of guiding me as to the number of years' purchase.

Then for that purpose you must have investigated the structural value?—Not the detail of the quantity of materials used, but the general character of the buildings, whether they are substantial or not, and their state of repair.

As to the number of years' purchase; in your examination you said you went into such details, and that it was in allowing for some of the retorts and ovens that you said you deducted two-thirds?—I said, if the work had been a new work, or in very excellent condition, I should have allowed them 16⅔ years; but, under the circumstances, I allowed only 16 years.

I observe here that you direct your attention to the gasholder and to the tanks; and you put in the two cast-iron tanks, which I understand your father contracted for at £2400?—Yes.

You then take the two telescope gasholders at £1535?—Yes.

These together are £3935?—Yes.

You know the size of these tanks?—Yes.

The Umpire: Do not you think we are a little wasting time in going into these details—I mean, the structural value—when the witness is himself protesting against the structural value being taken into his calculation? I mean, assuming a most successful cross-examination bringing out the witness's views as to the structural value, he would probably wind up at the end by saying, I protest against that being the basis of the calculation.

Mr. Hawksley: It does not appear to me that we have anything to do with the structural value, because, if the commercial value is nothing, then you fall back on the £16,500. The structural value does not help you at all. We are to find, according to the agreement, the commercial value; and if the structural value is £30,000, and if the commercial value is £16,500, we could not go beyond that.

The Umpire: I have no desire to press upon you any particular course of proceeding, but I give you my own view as to this part of the evidence.

Mr. Hawksley: I merely threw it out that the matter might be cleared up.

Mr. Creasy: I am afraid it will be thought I have replied rather against the views you have expressed, by pointing out the words of the agreement.

The Umpire: I only thought we were wasting time upon evidence which, as far as I am individually concerned, I think goes for very little.

Examination continued.

Mr. Logie: Now, then, as to the tanks, which you say you have estimated at £2400; will you give us your estimate of the quantity of iron in each tank?—Upon that I can give you the fullest particulars, if you require them; for I have looked through my father's estimate-book, and have abstracted from it the estimates.

What quantity of iron do you make in this tank? They are both of the same size, are they not? What is the quantity?—I have extracted from my father's book the cost of each of the tanks. The contract was for £760 for the iron-work of each tank. There was a loss upon the whole contract of £180.

Then, of course, you have had the means of getting at the quantity of iron that was required?—Yes. I will give you the details. Two tanks, 40 feet diameter by 16 feet deep; cost of each tank:—

Tank-plates, 77 tons 17 cwt., at £7. 15s. per ton	£546	8	3
Borings, 2 tons 10 cwt., at £10 per ton	25	0	0
Iron hoops, 2 tons 11 cwt. 2 qrs. 6lb., at 18s.	19	8	0
330 doz. ¾-inch bolts, at 3s. 6d.	57	15	0
1980 feet of jointing	49	10	0
20 yards of 9-inch pipe	12	10	0
Extra labour fixing	3	0	0
Ditto inlet and outlet pipe	2	0	0
Use of tools and tackle	5	0	0
Cartages, 10 tons	2	10	0
Total	741	1	3
Contingencies, 2½ per cent.	18	10	9
Total	759	12	0

That is for the iron-work alone. Mr. Mackintosh put in the foundations; I think the cost of them was at least £1000.

For the purposes of your valuation to-day, what do you take the price of iron at?—It is from an estimate of my father's that I have been reading.

Mr. Chambers: For the £2400?—I based it upon the contract to that extent; but the price of iron at that time was at about the price of the present day; £7. 10s. is about the price at the present day. You might, perhaps, get it half-a-crown per ton less.

Mr. Logie: Are you prepared to pledge yourself to that?—I do not pledge myself to it. Iron is a little cheaper than it was two months ago.

Mr. Chambers: But with reference to June in last year, how was the price?—Everything was high then. You would not get the tank-plates under £9 per ton last June.

The Umpire: These two competent gentlemen, who sit by my side, think that price is about right; the prices represent the contract.

Mr. Bovill: I wish the arbitrators to understand that, at the time

this reference was made in June last, the price of that description of iron was £9 per ton.

The UMPIRE: But Mr. Barlow is not charging at that rate.

Mr. LOGIE: Can you give me the weight of iron in the gasholders? How have you arrived at that number of tons?—I have made numerous contracts for clients for gasholders and tanks of this kind, and am well acquainted with the usual weights of such apparatus.

Is it from your general experience of weights in these matters? Do you recollect the thickness of the plates? Have you examined them?—No, I have not. My father had nothing to do with the gasholders.

But you have come here to speak to the value of these telescope gasholders. Have you examined them, to enable you to form an opinion as to their present value?—I have examined them, but without making a hole in them to ascertain the exact thickness. I could not, therefore, take my oath as to the exact thickness of the plates. I should think the plates are fifteen or sixteen-wire guage, the ordinary thickness for gas-holders; they are a very good job, in excellent condition, and very well made indeed.

Have you been informed, and do you know it is the case, that the last of the two gasholders was constructed for £635?—I never heard so; but then you may cite a contract which does not embrace the total expense incurred; for instance, a gasholder may be tendered for, subject to the company providing scaffolding and the painting, &c. I wish to put the arbitrators in possession of these facts.

But you cannot put them in possession of the facts in this case?—I don't believe you could get these gasholders contracted for now at less than £850 each.

Do you know when the last of the two gasholders was put up?—I think one was entirely new in 1847.

What do you allow for depreciation from that time to June in last year?

The UMPIRE: That appears as £165.

Witness: I think that is a sufficient allowance for depreciation.

Mr. LOGIE: I will ask you again—Do you know the weight of metal in these gasholders?—I know what pressure they give, and from that I could calculate the weight of metal. The best test of the weight of metal is the floating weight of the gasholder.

Assuming that this gasholder had been constructed, including the scaffolding, for £630, would you still be inclined to take off the amount you have stated for depreciation?—I should. In 1847 prices were low. The price of that description of iron was very low then. In 1854, sheet-iron, the material principally used in the construction of gasholders, was 50 per cent. higher in price than in 1847. Sheet-iron I have known to be as high as £13 a ton, and I have known it to be as low £7 a ton.

Now, with regard to the retorts and their settings—have you made a particular examination of them?—I have.

You put them at £800?—I have put them at £16 per retort, which includes the whole manufacturing plant within the retort-house.

With regard to the ovens—what do you estimate as the value of an oven suitable to a bed of five retorts of this size?—What do you include in the oven?

One bed fitted with retorts.—New?

Perfectly new.—£130.

Mr. CHAMBERS: Fitted with how many retorts?—Five.

Mr. LOGIE: What do you give to the retorts themselves in that estimate?

The UMPIRE: That includes everything.—About £26 a retort.

Mr. LOGIE: At the winter season, when the retorts are at full work, supposing a retort to be used from Christmas, and not let down, how long would that last on an average, being set in the best way?—That depends upon the mode in which it is worked.

Supposing it is worked for a quarter, beginning at Christmas?—I had prepared myself to answer your former question, as to how much of the £130 was for the retorts alone.

Yes; what do you give?—The retorts amount to £27. 10s. out of the £130.

Is that independent of the connections?—That is simply for the retorts—the part that wears out and has to be replaced.

I will now direct your attention to my other question, if you please. Supposing a new retort was set, and began to work at Christmas, and not let down, in about what time would you think it would require to be replaced?—A retort, at the temperature at which these are worked, ought to last ten months at least.

I have, somewhere in your examination yesterday, the ages of some of the different beds of retorts?—No, I think not.

You told me, I think, yesterday that you did not consider they were of good construction?—I said the furnace was not constructed to work upon the most economical principles.

Do I understand you to say that the furnaces are so constructed as that the retorts will wear out sooner?—No; they will wear the longer; but they will not make the proper quantity of gas.

Mr. CREASY: I understand you to say that they were not constructed in the best way?—That is so.

Mr. HAWKSLEY: I have it that the setting might be improved?—I don't know whether I said so; but no doubt such is the fact.

Mr. LOGIE: Now, as to the condensers. Direct your attention, if you please, to these condensers. You put them at £140 complete?—I have so.

Can you give me the quantity of metal in these?—They are an expensive apparatus, made of boiler-plate, rivetted with bends at each end—very expensive, and not a sort of apparatus that I should recommend any one to erect. I have no doubt they must have cost at least £300.

Do you know when they were erected?—I think they were erected in 1837.

Then they would be a part of the original construction?—Yes, part of the original works.

Is it true or not, to your knowledge, that, from the nature of the duties they have had to perform in the manufacture of the gas, they are liable to a considerable amount of extra wear and tear, being wrought iron?—No; for they are covered over with an impervious coating of tar.

Before they were covered with tar, what do you say as to that?—I fancy they have been tarred from the commencement.

Do I understand that you have made no allowance for depreciation as to the condensers?—Oh, yes, I have! I have said that I should think they cost at least £300, and I have only put them down at £140. At the period they were made they would be worth £36 per ton.

Mr. SPICE: Do you think they were ever worth making at all?

The UMPIRE: Mr. Barlow evidently thinks they were a very expensive construction.

Mr. LOGIE: Do you know what is the weight of metal in these condensers?—No, I do not.

Then, calculating it at so much a ton, how do you arrive at it? Is it from a general notion of what the weight of such things must be?—Yes; but, in addition to the condenser, there is considerable value in the pipes and valves connecting with it.

You include all these in your valuation?—Yes.

But still you are not prepared to give the weight of metal, whether there is nine tons, more or less?—Of wrought iron or cast iron altogether?

Yes.—I should say there are more than nine tons.

Of wrought iron, how much?—I should think of wrought iron there are upwards of six tons. They are made of ¼-inch boiler-plate.

Do you know the weight of metal in the cast iron dry-lime purifier, with wrought iron cover, which you have put at £160?—No; I do not. I am constantly in the habit of making contracts for these kind of things, and can form a tolerably accurate idea of their value.

But not without ascertaining the quantity of metal?—Yes. I make a specification, and give the thickness; but I never myself work out the weight of the metal. I could give you an approximate estimate of the weight.

Can you give me either an approximate or an ideal estimate of the weight of metal in the dry-lime purifier?—Of the wrought iron, the cast iron, and the connection?

Yes, separately if you choose?—You are referring to the £160 item?

Yes, I am.—They will be about fourteen tons, including the valves and connections.

I take that as your answer. You give an estimate of £250 for water-pumps, service-pipes, filling-pumps, and sundries: these are the connections of the work?—Yes.

Are these above-ground or under-ground connections?—The bulk of them are under-ground.

In fact, might be described as under-ground main, I suppose?—Yes; and service pipes and pumps.

What means have you of arriving at that sum of £250?—Instead of £250, I have not the least doubt that the cost would be £1250.

Then you allow £1000 for depreciation?—It would be so at the sum I have put it.

I did not catch what you said as to the means you had of arriving at that estimate. You say you have no doubt they cost £1250?—Under this head, I have no doubt £1250 has been spent.

Have you made a special examination of the mains yourself?—I have: I have seen the ground opened, I should say, in twenty places.

I don't understand that you pledge yourself as to the correctness of the schedule with regard to the mains?—No; I took that from Mr. Barnard's account.

And the same with regard to the meters?—I have given no particular attention to the meters.

Now, with regard to the service-pipes. Have you a knowledge of the state in which the service-pipes are?—In examining the mains some of the service-pipes were also laid bare.

Have you made any special examination of the service-pipes?—I examined them when I examined the mains.

Was the examination to any considerable extent? Have you seen more than 20 of the service-pipes altogether, do you suppose?—I should think I have not.

Then, as a general question to all these items, leaving out for the present the tanks which your father constructed, and the figures of which you have given with regard to all the others, I suppose your estimate is formed not upon the details, but upon general experience in these matters?—It is so.

Do you consider that a safe way of ascertaining the structural value of such works as these?—As I have already stated, had I been aware that I was to be examined upon the structural value, I would have gone more into details, but I had no instructions to do so.

Was this estimate prepared since your examination yesterday?—Oh, no! I had these papers all with me yesterday.

Have you yourself been at all concerned in the carrying on of gas-works as manager or otherwise?—I have been a lessee of gas-works.

And did you yourself take an active part in carrying on the business?—No; I trusted to those whom I employed.

Where was it you were lessee?—At Taunton.

When, and for what period, do you remember?—I will endeavour to be correct. I think we had the lease for 7 years, about 1835.

Commencing at 1835?—Before 1835.

What was the price of gas then, do you remember?—No, I do not.

I thought your attention might be called to the price, as you were the lessee of the works?—I cannot say what was the price.

Can you say whether it was above or below 10s.?—I can't say.

Can you fix any sum as the price of gas at that time, or during any part of that period?—I cannot charge my memory with it. I should not like to state it without being certain of the fact. My father was lessee of the Salisbury Gas Works, and I had the charge of the accounts connected with them.

I have no wish to ask the question unnecessarily, but did you find that a profitable speculation?—We did.

Mr. Logie: Mr. Barlow comes here to speak as to the annual value of these works, and he sets that value at a certain figure, and he gives the price of gas. I ask the question to show that, under other circumstances, Mr. Barlow says, if he had had the management of their works, the Surrey Company would never have come into existence. There are reasons for supposing he may be mistaken in that, both in his capacity of manager of gas-works, and the necessary result.

The Umpire: He has given you an answer, that his management of the works he leased was successful.

Witness: Yes; my father paid a high rent for the works, and there was a profit both at Taunton and at Salisbury. I dare say I can find the books, and could give you the figures exactly, if you wish it.

Mr. Logie: You have stated that, in ascertaining the commercial value, you ascertained the capabilities of the works for producing gas, and also the demand for gas in the neighbourhood?—Of course, if I did not think there were means of consuming the gas produced, that would go to diminish my estimate considerably.

But do you think it fair to introduce the demand for gas likely to arise, instead of taking the actual demand?—I think it is fair to do so. You have evidence that, in addition to the 480 consumers, 42 persons had applied for gas during the last year.

And do you consider that more than an ordinary increase?—Yes; that was only in a few months, which was a large per centage upon the whole number of consumers.

You state that the price charged by the Deptford Company to private consumers was less than that charged by the Surrey Company?—It appears the Deptford Company charged 6d. less last year.

And that may be a reason for the 42 persons applying for the Deptford Company's gas?—Very likely, but no doubt they were anxious to become consumers of gas.

When a company has been established for many years in a neighbourhood, do you think, in placing a value upon it at purchase, you ought to take into account, as a main item of account, the probable demand for gas, when that company has not the exclusive privilege of supplying that neighbourhood with gas?—I maintain that for present and future consumers they had exclusive legal possession of the district.

Why so?—Because, as an incorporated company, I believe they could have successfully prevented opponents from breaking the ground.

I believe the Deptford Company was in the same position as to powers as the Surrey Company up to 1852; it lived only by authority from the parishes?—In 1852 they got statutory powers.

Mr. Bovill: From the beginning of 1854 there was an arrangement as to the district to be supplied by each company.

Mr. Logie: In point of fact, the Surrey Company was competing up to the time of the passing of the bill and the making of the agreement?—They were competing, no doubt.

They had not suspended operations for any moment?—They continued the supply, of course. I do not know whether they took on any fresh consumers. If I had had the management of the Deptford Company——[Mr. Creasy: You would have smothered the Surrey Company.]——they never would have come into Deptford.

Re-examined by Mr. Chambers.

In the course of your cross-examination yesterday, Mr. Barlow, you were referred to several sales and purchases of gas-works, upon the principle you first started with, viz. the quantity of coals carbonised?—Yes.

I will just suggest to you what they were, in order that we may get them upon the notes.

The Umpire: We suggested that there were so many varying circumstances, that hardly any case could be strictly analogous to another.

Mr. Chambers: They had selected certain gas-works, and I don't know how they want to use them. My friend wished to know them upon the shorthand writer's notes, and if a part is put there, it is desirable that the whole should be put there.

The Umpire: If you recollect, we rather checked their cross-examination, coupled with an expression of opinion that the cases of Burnley and Lowestoft were very far from being analogous, Burnley being an inland manufacturing town, and Lowestoft a place on the sea; and, therefore, they could not be mentioned as analogous cases, or even analogous to the case under inquiry.

Mr. Chambers: There are seven cases mentioned; we take the general answer, that, in the seven cases mentioned as those in which you were engaged in determining the terms of the purchases, you ascertained the quantity of coals carbonised?—I did.

During the year?—During the year preceding sale.

Then did you proceed to ascertain what profit that quantity of coal carbonised would make?—I have done so in each of the cases.

Well, is that a principle to which you think you may fairly resort to judge of the productive power of a gas-works?—It is so, if the works are of equal capacity.

That is all I want; and a fair way of testing the accuracy of your calculation?—I consider so.

The Umpire: And equally so the quality of the coal?—Not exactly so, inasmuch as the same apparatus is required, whether for good coal or bad. It gives a fair test of the relative value of the works. If you take a gas-works consuming 5000 tons of coals a year, and take the cost of apparatus and plant at £8 per ton of coals carbonised, you will not err 5 per cent. all over the country.

Mr. Hawksley:—Surely that will not hold good as regards the cannel coal used in Glasgow, and the slaty coal used in Bristol?—I think it would as to the cost of apparatus and plant. I said within 5 per cent. The quality of the coal only bears upon the question of retorts. It involves no other portions of the apparatus. I thought the Burnley case offered a fair comparison with this case, inasmuch as the quantity of coals consumed by each was nearly the same amount. The price of the coal at a particular place has nothing to do with the question of the value of the apparatus required for producing a given quantity of gas; and, as I have said, I don't think that will be found to vary 5 per cent. all over the country, in works of about the same capacity.

Mr. Chambers: In your cross-examination yesterday, a reference was made to what my friend was pleased to call the "goodwill," and you were requested to state your own definition of the term "privileges," as applied to a gas company. Will you be so good as to illustrate your meaning as to this?—I will take the instance of a public-house, with a licence attached to it. That will sell for something considerable in the market over its value as a house, in consideration of the trade which is attached to the house.

Then, again, supposing there is no other licensed house within a given distance, that would make it the more valuable, would it not?—No doubt of it.

Although there might be another party selling beer illegally without a licence?—Undoubtedly.

And you liken the Surrey Company to the house which sells beer without a licence, against the house which has the legal right to do so?—It is very much like it.

Mr. Creasy: Pray, keep your analogy down to the lower standard; keep to the Tom-and-Jerry business.

The Umpire: You mean, that they were necessitated to get an act of Parliament before they could lawfully oppose you?—Yes.

So that you consider you had an exclusive privilege, amounting to a goodwill?—I say that 481 consumers in the Deptford Company's mains were compelled to deal with the Deptford Company, provided that company supplied them with a good quality of gas, and complied with the conditions of the Gas Works Clauses Act of 1847, and charged a price not exceeding that of the surrounding districts. I maintain that those 481 consumers were compelled to deal with the Deptford Company.

Mr. Chambers: That is, they had the goodwill of these 481 consumers.

The Umpire: You mean that they were likely to deal with the Deptford Company?—They must deal with the Deptford Company, or cease to have gas.

Mr. Chambers: How do you explain that?—I mean that the Deptford Company, by exercising the powers of their act of Parliament, might prevent any of those 481 consumers leaving them and going to the Surrey Company.

Without an act of Parliament?—Of course, I mean without an act of Parliament.

In point of fact, you have 481 persons dealing with you, and they get that trade from you?—Yes.

You have the value of these works, at 16 years' purchase, in the net annual profit? You also mentioned that you knew of an instance in which as much as 24 years' purchase was paid. Do you know what made the higher value in the case you mentioned?—That was the case of the Dublin Alliance Gas Company. They were in competition with another company, and they were bought at 24 years' purchase.

The Umpire: How was that divided?—By an arrangement to give the shareholders £6 for every £5 share.

Mr. Chambers: It was to get an opponent out of the field. With regard to these estimates of the plant and so forth, you have been closely cross-examined with reference to weight of metal and dimensions. As a practical gas engineer, are you able, upon sight of things, to judge what price ought to be given for them, without going into details?—Certainly, having a general knowledge of dimensions and construction.

You can say, "that is worth so and so, in my judgment," without knowing the precise weight of metal? You can judge by the eye?—I am so much accustomed to these things that I can tell at once.

And, in estimating the commercial value of this undertaking, you have brought to bear an extensive practical and personal experience? I have.

Mr. Chambers: That is all I have to ask Mr. Barlow.

The Umpire: Whilst charging only 4s. for the gas, you appear to have based your calculation upon the charge of 4s. 6d.?—I have done so.

Is that because you found your neighbours were able to get 4s. 6d.?—No; it is not precisely upon that. Even 4s. 6d. is a low price for the gas. I think the public in that district ought to pay 5s.

Then, whilst actually charging only 4s., you base your calculation upon the possible charge of 4s. 6d.?—I don't think there can be a doubt that the Deptford Company might have charged 4s. 6d. if they choose.

Be good enough to follow my question. Their actual charge is 4s.; there is no mistake about that?—No.

And your calculation is based upon the charge of 4s. 6d. Why is that?—Because 4s. 6d. is the price of gas in the surrounding districts.

That is, you found your neighbours could get 4s. 6d.?—It is so with all the surrounding companies. The three southern metropolitan gas companies were supplying gas at 4s. up to the 1st of January, 1854, when they arranged upon portioning out the district amongst themselves, and raised the price to 4s. 6d.

And is it because you find the public are content with the charge of 4s. 6d. all round, that you assume the Deptford Company may be put in the same category?—There were no reasons why the Surrey district should pay a higher price than the Deptford.

And you think 4s. 6d. might be got out of them?—No doubt of it.

Do you think when the Surrey Company get this they will be enabled to charge 4s. 6d.?—I have not the least doubt of it.

Mr. Spice: In the circumstances that the Deptford Company are selling at 4s., and at that price they have 481 customers, now is it possible that, if they advanced the price, they would retain those 481 customers?—I have not the least doubt that they would.

Mr. Hawksley: Is it within your experience as a gas engineer that it is the habit, in calculations of this kind, for arbitrators to take into consideration the price of gas, and to reduce or increase the price according to the circumstances of the case?—In all cases in which I

have been engaged, the arbitrators have done so. If they have found the price of gas too high, they have lowered it, and if too low, they have raised it. In Burnley they were selling the gas at 3s.; but when the arrangement with the town council was made, the calculation was based upon the price of 3s. 6d.

Has it been the practice, within your experience, to take on the net profit so adjusted 16¾ years' purchase for gas-works between one company and another?—Yes; on the net profits.

You do not answer my questions. After adjusting the profits by the diminished or increased prices of the gas, which the arbitrators think the circumstances of the case demand, has it then been the practice to apply as the multiplier 16⅔ years' purchase to the profits so ascertained?—That will depend in a great measure, as I have said before, upon the tenure on which the property is held. Taking the property as freehold, and in good state of repair, 16⅔ years' purchase is, in my experience, the principle invariably adopted.

One other question as to goodwill?—If you wish for further information upon that point, I can give you two or three instances where companies have been formed on the basis of 16⅔ years' purchase upon the net profits of the year preceding sale. Where the works belonged to private individuals, that has been the case; and the works were to be worked for twelve months, and capitalised at the rate of 16⅔ years' purchase.

With regard to the question of goodwill, you have mentioned the instance of a public-house with a licence attached. Discard from your mind for a moment the question of the licence, and suppose the house to be let at a certain rental, say £80 per annum, and the tenant acquires a good trade to the house; supposing he is desirous to leave the house, and he offers his goodwill for sale, could he get anything in addition to the landlord's rent?—There is no doubt he would, because there would be the trade to the house.

Does he get a better value for the house being licensed than if it was not licensed?—There can be no doubt of it.

Supposing the tenant having a good business fails in trade, and the landlord takes the tenant's business, which is to some extent the case here. Then the landlord lets the house with a licence attached to it, and the former tenant's goodwill. Will he then get for it more than his £80 rent?—No doubt of it, because the trade is attached to the house. People who are in the habit of dealing at a particular house will continue to do so, whoever may be in possession of the trade.

One other question. You say you have valued these works upon a calculation of an annual profit of £1617. Supposing you had a manager to pay, which was the case with Mr. Barnard, can you assure us you could make a profit of £1617 a year, exclusive of the salary you pay to your manager?—Most assuredly.

You would make that profit out of the working of the concern?—No doubt of it.

How much do you think you would have to lay out to put these works into a good condition?—I think about £1200.

If you laid out this £1200, would it enable you to get a better rental than the company were getting at the date of this agreement, taken irrespectively of the rise in the price of gas?—It would enable me to economise, to some extent, in the cost of a production.

Would it enable you to supply more consumers beyond the 481?—It would. The works, with £1200 laid out upon them, I think would be capable of producing 30,000,000 cubic feet of gas per annum.

That would be about 25 per cent. upon the present make of gas?—Between 20 and 25 per cent. more.

Now, you think there was something in the nature of a goodwill at the time this agreement was made, in the nnmber of customers, and the prospective increase in the price of the gas?—Yes; I think so. No doubt of it.

I have mentioned four elements of goodwill. Do you agree with them?—I do.

Have you anything to add upon them?—No. That expresses my ideas on the subject.

Mr. Creasy wished, at this stage, to put a question to his friends on the other side. He wished te ask whether it was their intention to call Mr. Hills upon the subject of the right and title to the dock?

Mr. Bovill: We will call him if it is your wish; but it is not to be expected that he is to be subjected to a cross-examination, to the prejudice of his own interest in the dock in question.

(It was agreed that Mr. Hills should make a statement, in writing, of his claim of right and title in respect of the dock.)

Mr. Creasy also requested that a return might be forwarded of the ages of the meters, so that no delay might be occasioned when they came to that part of the case.

Mr. Creasy inquired whether there was any map of the underground mains?

Mr. Barnard: There is no map of the yard-works.

Mr. Creasy: But I suppose there is a map of the general system of the company's mains outside the yard; and I shall require a copy of that. How soon can I have that?

Mr. Barnard: I should think by Tuesday.

Mr. Creasy: Very well. Be so good as to let me have it.

Mr. Hawksley: There is one question I would like to ask Mr. Barlow with regard to the meters. In your estimate of the annual profit of £1617, have you included any sum for the rent of the meters?—No. I assume that the meters are given gratuitously for the use of the consumers. No charge is made for them; they pass to the Surrey Company as a gift.

Mr. *Barnard* recalled.

Witness (to Mr. Logie): Did not charge for the dead mains.

Witness (to Mr. Sandom): Did not amend the list put in yesterday.

Mr. Chambers: We discovered some more mains yesterday, and he has added them.

The Umpire: Then do you mean to put this in as a corrected list?

Witness: Yes.

Mr. Chambers: What is it?

Umpire: A list of the under-ground mains. Have you added those which you found yesterday?

Witness: Yes. Had some doubt about the 10-inch main, and put it down as a 9-inch.

Witness (to Mr. Bovill): There were six directors when the company was first formed, afterwards 5, then reduced to 3, and after that there were 4 again. The number was reduced to 4 in 1847 or 1848, but they got the same salary as the 6. £210 a year was allowed by the company formerly; they had a guinea for each attendance. Cannot say exactly how many meetings were held in a year; they met in London; did not always attend; believes they met every month. The £210 is charged in the accounts; the salary to directors, secretary, and rent are charged in one item.

Witness (to Mr. Logie): The coals were not brought to the dock always in lighters. Sometimes they had them in small ships. Considered there was a loss of 7d. between the 5d. per ton lighterage, and the 1s. per ton from the vessels.

Witness (to Umpire): Had 480 customers, and 42 new applications. Don't know that any customer left during the winter; had not lost one for the last nine months.

Witness (to Mr. Bovill): Could have many more customers had they gone to the expense of fitting new meters; this would not answer their purpose for the short time they had to supply them.

Witness (to Mr. Hawkesley): The directors' salary was paid before the profits were allowed; when the new administration came, salaries ceased; this occurred in August, 1853.

Mr. *Hall* recalled.

Witness (to Mr. Bovill): It appears in the books that £210 a-year was the amount paid to the directors, and this was a charge upon the concern before stating the profits.

Alfred King, Esq., examined by Mr. Chambers.

Has been for many years engineer-in-chief to the Liverpool Gas Company, and since 1848 to the Liverpool United Gas Company. The total commercial value of the gas manufactory to be sold by the Deptford Company was about £26,085. His calculations were these:—In 1854, with the price of gas at 4s. per 1000, he found the income was £3305, or equivalent to a sale of 16,525,000 cubic feet. To the quantity he had added 16 per cent., as equivalent to a loss on the gas made. That 16 per cent. was equivalent to 264,500,000 cubic feet; or the quantity of gas to be made to produce that income was 19,170,000 cubic feet. If the 16,525,000 cubic feet were sold at 4s. 6d.—the price charged by the Surrey Company—the income for the year 1854 would have been £3718. Estimated the cost for 19,170,000 cubic feet, at 2s. 6d. per 1000; that would amount to £2396, leaving a profit of £1322; allowing 13 per cent. for spare retorts, or retorts out of use. The works are now equal to the production of 24,021,000 feet; the present demand, as already shown, is 19,170,000, leaving a surplus power in the works of 4,851,000 feet. A deduction of 14 per cent. on this quantity would amount to to 679,000 feet, and leave a net surplus of 4,172,000 feet. The profit on this, at 2s. per 1000, or the difference between 4s. 6d. and 2s. 6d., is £417, and will make a total profit of £1739: that at 15 years' purchase would amount to £25,085. Had taken no account of it as for a compulsory sale, but had taken it as a prospective and commercial realisation.

Cross-examined by Mr. Creasy.

Witness thought the fair commercial price would be £26,000, for which the purchaser would receive £1739 per annum—that is, at the rate of 6½ per cent. or fifteen years' purchase. Had he the concern, he could realise these figures, and would not sell for less. His calculations included all the costs of making the gas, directors' salaries, all salaries, rates, and taxes, bad debts, and every other charge. Thought £3000 might be laid out advantageously on these works. A liberal man would gain more by an outlay than a stingy man would by not making it.

Mr. *William Richardson* examined by Mr. Bovill.

Is consulting engineer of Dudley. Has been exclusively engaged in gas matters for the last thirty years, as valuer, arbitrator, consulting engineer, and every way connected with gas. Was consulted about the Deptford Gas Works. Considers their situation desirable, their position advantageous, as a practical man; and, considering the ordinary chances of competition, estimates the commercial value of these works at £26,880.

Cross-examined by Mr. Logie.

Has taken into consideration the existence of a rival company, but not actually competing. Supposing a competing company to exist, would not have to reconsider his estimate. Would not be afraid to meet a company. Does not think that having exclusive possession of the district would induce him to form a different estimate of the commercial value of the undertaking. The value placed on the undertaking would meet both cases. Exclusive or non-exclusive possession of the district would not affect the value at the price fixed. Arrived at that value on account of the excellent plant and its capability of producing 24 millions cubic feet per annum. Takes one-sixth for waste, which includes everything—leakage of every kind. Did not examine the mains to any great extent. Formed his estimate on what the works would produce, and what the common leakage of the country is. The mains have been opened within the last three days; they are in very good condition.

The Umpire: The manager's evidence is this: in 1853 there was a loss from leakage of 33 per cent; formerly it was 12 per cent.

Witness (to Mr. Logie): Saw ten or twelve places opened. Examined them with his usual minuteness. Did not see why the entire should not be in as good condition as the parts opened. The mains were put down between 1837 and 1839. The mains of that period were far more valuable than the mains of the present day. Knows the works well, not the extent of land they cover. They are moderate-sized. Should say that 2s. 6d. was the outside sum for the cost of gas. Referring to the price of coal in London, and to the size of the works, 4s. 6d. would be the fair price which ought to be

charged. Is lessee of the Dudley Gas Works. The average price of gas there is 4s. 2d. Could not bring to recollection at that moment any gas-works of the extent of the Deptford Works carrying on its trade at the same price. The only works near it were his own. His rental was between £4000 and £5000 a year. A water frontage is of great importance to gas-works. As regards the landing of coal and taking away the produce, it would be very objectionable to have the water frontage taken away, or questioned or interfered with.

Re-examined by Mr. Bovill.

It is of no consequence whether anybody else had a joint use, provided there was access to bring coal and take away produce. Should have put a different price on for a compulsory sale. Is partially aware that the Surrey Company came in without an act of Parliament. As soon as the Surrey Company get their works, the rental, in his opinion, will increase. If managed well, they will keep the thing up to its value. Thinks Mr. Croll could manage them well.

Mr. Bovill: Now produce your agreement with Mr. Croll. We shall require it at the next meeting.

Mr. Creasy: Anything bearing on the case you may have.

Witness (to Mr. Hawksley): With that company in existence, if he could sell 24 million feet of gas, and if the other company was getting 4s. 6d. per 1000 feet for its gas, should sell his gas at the same price as them. Should come to terms, even if they had to divide the difference.

Mr. *Barnard*: I stated yesterday that there was a leakage of 33 per cent. I do not consider it all leakage; many of their consumers are connected with our service-pipes, which are on the houses. One case has been discovered where they have tapped the main, and were supplying the consumers. It is impossible for the 33 per cent. that is waste to be accounted for in any other way than that there are some of their consumers connected with our service-pipe.

Mr. *Barnard* (to Umpire): Not the least doubt but this could be mended, if they were going to carry on the works; it could be reduced to 12 or 14 per cent. for the sake of £100.

Third Day, April 14.

Mr. *Hall* recalled, and examined by Mr. Bovill.

Went through the accounts with Mr. Broome, the accountant on the other side. His statement contained more. Mr. Broome takes it from 1845; his, from the beginning, agreed with him in certain figures, leaving the application of those figures to the arbitrators.

Mr. Bovill: The difference is, we include as part of the profit money what has been paid by way of interest on bonds and debentures, and for loans.

Witness: And preference shares.

Mr. *Broome:* What are treated as a loan also.

Mr. Bovill: They call them preference shares. They are loans, interest on loans, bonds and debentures; and that accounts for the difference between the two. We shall submit a statement in which those figures will appear separately; and then my friend Mr. Creasy can discuss the principle.

Mr. *Broome* (to Umpire): Mr. Hall, on behalf of claimants, has reckoned as profit the interest referred to; the paper shows that he makes the profit larger. The differences consist principally of interest paid on bonds, debentures, and mortgages, charged against revenue, which should not be. Mr. Hall maintains, if they had not been so charged, the profits would have been so much the more.

Mr. Chambers: We have been trading on borrowed capital.

(A copy of the statement was here handed to the arbitrators.)

Mr. Bovill: The payment to the directors is not included. We say, that must go to the profits.

The Umpire: The concern was yielding what ought to be accounted profit, but it was improperly spent.

Mr. *Broome* objected to put the directors' salaries in addition.

Mr. *Thomas Sharp* examined by Mr. Chambers.

Is a consulting engineer. Has had 30 years' experience in that branch of his profession, connected with gas-works. Resides in Leamington. Valued upwards of 60 gas-works in various parts of England. Has sold and leased a great number, and always gave satisfaction. To arrive at the commercial value of gas-works, takes the gross rental, and ascertains the net profit; judges of the number of years' purchase he ought to give on the net annual property by the capability of the works, and their state when sold. Has seen the accounts; the commercial value is £26,040. Considers the situation of the works very advantageous and valuable, and in a very good position indeed. Generally agrees with the favourable opinion of the works expressed by the previous witnesses. One or two of the witnesses were rather out in their calculations: his was £26,000.; the other, £28,000, valued at 15½ years' purchase. Discounted defects, and allowed for competition that is said exists, and for future competition. Could find people who would take it at his valuation. The works are capable of producing 24,000,000; deducting 5,000,000 for absolute loss—a large allowance—leaves 19,000,000, which, at 4s. 6d. per 1000, would yield an annual rental of £4225. A respectable lessee would give 40 per cent. on that rental as rent, which would produce about £1800 per annum; and that at 15½ years' purchase would yield the amount stated, £26,000. With an outlay of about £1000, the make of gas might be increased to thirty millions, instead of twenty-four millions. The probability of the increased demand was obvious from the growing neighbourhood. Was all through the district, and personally observed the class of houses and shops, and satisfied himself that a great deal more gas might be sold if the works were properly managed. Thinks the gas ought not to be sold at less than 4s. 6d. Last year was employed to make a report on the state of the works, in order to give evidence before the Parliamentary Committee; spent some days over it, and walked over the district.

Cross-examined by Mr. Logie.

Was engaged four days last year in going over the works and the district; his attention was principally directed to ascertain the probability of increased consumption. Ascertained what they were doing, but did not go into their financial affairs. The yield of gas at present is at the rate of 24 millions; the annual rental £4225; 30 millions could be sold. The works were not well worked; he meant by the mode of management, the system on which they charge their retorts, the kind of retorts they use, and the general management of the works. One party, with the same tools, will make a great deal more gas than another. Does not think these works have been well managed; they have not paid attention to the apparatus, to keep it thoroughly clean and in efficient state. The mode of charging the retorts is bad and expensive; the coal does not produce the quantity it ought, if the retorts were managed differently. If a lessee took these works, who would manage it properly, he would make a great deal more money out of the same capabilities. The plant has not been deteriorated by neglect; it is as good as the first day it was put up. The retorts are well set. The retorts are not such as he would have, but they are well set, and in very good working order. There were other circumstances beside the management which would improve their condition: they have not been sufficiently accommodating to their customers outside. Has heard complaints about little matters left unredressed. Holds two leases of gas works; has had them some years. The company had not paid a dividend for eleven years, and the other only 2¼ per cent. Took them at 6 per cent.; of course makes more than 6. The company could never have made 6. This shows the difference between good management and bad.

To Hawksley: Thinks the Surrey Company, if they behave politely, will make a good deal by the transaction. Will have a great bargain of the purchase at this price.

Examination resumed.

Mr. Croll will have a different management, and make a good deal of money by it. Thinks it as fair a way to ascertain the value of works to obtain a knowledge of the capacity of production, either in their present state or with an increased outlay, as it would be to ascertain what they have already produced and been able to sell. Thought that a fair way for the buyers. Took into consideration the business doing, profit gained, what could be done with superior management, and the prospective value as well. Had been in treaty that morning for a set of works. Valued them on the principles stated, and was since bidden within a few hundred pounds of his valuation. Cannot give all the circumstances of the case, because the matter is in the market. Was not aware of the extent of the competition before the passing of the Surrey Gas Act. Thought it did not at all affect the valuation.

To Umpire: Did not know that the Surrey was supplying that district.

To Mr. Logie: If the Surrey get this district, they will be powerful opponents. If they had all the district to themselves it would be a complete monopoly, and they could do better, and make a better profit, than if they were obliged to sell gas cheaper, because they had a competition. Thought that the fact of an actual competition was taken into his calculation, but is not certain.

To Umpire: Did not know the Surrey was supplying within their district; they threatened to come into it.

To Mr. Logie: Could not give an idea how far the estimate must be corrected, without an accurate knowledge of the relative position of the two companies. Counsel might take it, if he liked, that the estimate was founded on what he was informed of the state of the company and its capability, and the rest to be a hypothetical demand for gas in the neighbourhood.

Re-examined by Mr. Chambers.

He certainly used his knowledge, experience, and judgment in forming an opinion on the certainty of an increase. Was not aware there was any actual competition going on. Heard that only in some few instances they had laid down their pipes in the Deptford district. Conceived it was mere crossings, and that they had no line of mains supplying. Was aware that they supplied some few houses in the Deptford district. When making his estimate, had taken into consideration the threat to come in as competitors. Was aware they could not lawfully compete without an act of Parliament. Such was the Sheffield decision. If they never got an act of Parliament, would still adhere to the full amount of his estimate. In the two instances in which he had become lessee, actual losses had been sustained by the companies; in one of them for eleven years. With a perfect knowledge of these losses, took at a rent which yielded six per cent. to the shareholders, with a large sum as profits, in both cases, in his pocket. Had they been properly managed by the companies, six per cent. and a great deal beyond it would have been realised. Such, he thought, would also be the case with the Deptford works, if properly managed. It would be a beneficial speculation to take them at six per cent., looking still to possible future competition, but not to a permanent monopoly. Gave his attention to the large salaries paid to the four directors for the management of the works. It certainly was not proper expenditure to allow four servants, in the shape of directors, £280 per annum; to have none would be better.

To Mr. Hawksley): Did not value the bad management of this company as a thing to be transferred to the Surrey Company. The Surrey will manage a great deal better.

The Umpire: Without expressing an opinion on the effect of the evidence, do not you think that in the examination of Mr. Barlow, Mr. King, the gentleman from Dudley, and Mr. Sharp, we have a sufficient knowledge of the case? You may examine Mr. Lee and other gentlemen in the room, but if you have proved this case sufficiently, is not that enough?

Mr. Creasy: I shall probably call several witnesses.

Mr. Bovill: I shall fall in with the views of the arbitrators.

The Umpire: All the arbitrators say is, that several competent gentlemen have been called; several more are in attendance. We merely throw that out.

After some further conversation on the subject, the examination proceeded.

Mr. *Charles Lee* examined by Mr. Bovill.

Has been a surveyor for many years. Had great experience in

connection with gas and water companies. Valued 140 metropolitan parishes. Has acted as arbitrator and valuer. Visited the works at Deptford; they are in a favourable and advantageous position. Was aware of the capabilities of the works, and has known for several years the neighbourhood. Buildings are on the increase there. Thought, without an enforced sale, the value—the fair commercial value—of those works was about £25,417. Assuming a forced sale, should add 10 per cent.; that was the usual practice. That would make a total of £27,958. Did not rely on structural value. Always opposed structural value being taken. Went carefully over the works to form an opinion as to the structural value; also the value of the land, and the various other matters. The detailed estimate of the structural value is £20,648. Had assumed a joint use of the dock with Mr. Hills. Saw Mr. Hills landing some goods, and was told he had a joint occupancy.

To UMPIRE: Meant, by the expression joint use, that Mr. Hills may unload when he thinks proper, and the gas company may do the same. Mr. Hills was unloading when he was there.

Cross-examined by Mr. CREASY.

Mr. Hills had two barges in the dock. It would not, he thought, hold more. Saw Mr. Hill's tank there. Would turn it into the creek if he wanted to unload. Mr. Hills and the company are tenants in common. It was a case of first come, first served. There is sufficient accommodation for both parties, if they exercise their privileges in that way. Did not allow anything for the assumed right of way over the 3450 superficial yards of land, though the holders, if they please, may build up to the wall, and use the whole of the land, if they please. The annual value of the land is about £150, and 20 years' purchase. Would readily let for that. Calculated the mains and the meters, not from hearsay, but with reference to other gas-works, which he valued on a scale laid down by himself.

To UMPIRE: Would not put this valuation of £20,000 to sell to a tailor; it must be to a gas company or a wharfinger, for the purpose for which it was then used. Did not make a personal inspection of the mains and meters. The quantities were supplied. The figures were his own. Arrived at the amount of £25,417 on this plan, took 25,000,000 cubic feet as the annual produce. That, at 16¾ years' purchase, or at the rate of 6 per cent., amounts to £26,917; deducting £1500 for repairs and setting up pipes, &c., leaves a total of £25,417, the amount of valuation. That sum embarked in it would yield 6 per cent. Put the cost of gas per 1000 feet at a little more than 2s. 2d. per 1000, and assume the selling price to be 4s. 6d. per 1000 after the leakage had been deducted, the cost of production was £2705. 14s. 8d.; allowing one-sixth for leakage, there remains for sale 20,834,000 feet to sell; which, at 4s. 6d., is £4687. Deducting £375 for renewals, leaves a net profit £1606. 18s. 4d.; that capitalised at 16¾ years' purchase, makes 6 per cent. on the amount. Lived in London. Knew Deptford well. Did not suppose that the population of St. Nicholas had been on the increase. Knew the district of Hecham. Had not turned his attention to the locality in forming his calculation. Thought it was supplied with gas by the Phœnix. Had not consulted the population returns to form an opinion. Building had not been going on very fast the last two years. Money was scarce. Expected consumption for all the gas from public and private consumers. As streets are made, lamps must be put up. Thought the Deptford Company had the exclusive use of the district. The Deptford Company have provisions of an exclusive ground, and no other can intrude upon it.

Re-examined by Mr. BOVILL.

Has no doubt that 25,000,000 feet of gas could be got rid of yearly. That quantity will be got after the Surrey Company has been got rid of. 4s. 6d. per 1000 feet will be obtained. In my calculations, should go more by the ground than by the population returns. Would not judge by the value of the building of the probable mean of the consumption—rather by the shops and factories. They consume a greater quantity than small private houses. Had built a factory which required 50 lights, which required more gas than 50 houses.

Mr. *Geddie Pearse* examined by Mr. CHAMBERS.

Had been for about 38 years an engineer. Was acquainted with the construction and arrangement of gas-works. In 1822, erected gas-works in St. Petersburgh; was connected with the British Gas Company for about 30 years; was superintendent and engineer for 23 years; is consulting engineer to several provincial gas companies; was engaged in constructing gas-works; had considerable experience in negotiations, and knowledge of negotiations for sale. Was acquainted with the Deptford Gas Works, and inspected them; knew them from nearly the commencement. Agreed with the gentlemen examined, in regard to their situation, capabilities, and other circumstances. There are capabilities of manufacturing about 25,000,000 cubic feet per annum. Made the fair commercial value of the works to be £28,246. 10s. 6d. Did not think the structural value a fair criterion. Never knew it to be adopted. The structural value was £21,197. 11s. 3d. Allowed £500 for the expenses of the act of Parliament, which made the figures £21,697. The £21,112 is exclusive of the act of Parliament. There can be no doubt of the increased demand upon the mind of any one as to the progress of gas lighting. 25,000,000 is not adequate to the increase that should be expected in the district; there would be a demand for the 30,000,000, which witnesses have said the works with a little outlay would produce. The annual increase would amount to much more. Had made 100,000,000 feet upon a site very little larger. The ground presents sufficient area for the production of that quantity, if required.

Cross-examined by Mr. LOGIE.

Structural value is not a fair criterion. Never knew it to be adopted in these cases. The basis on which he formed his calculation was, not what had been done, but what might be done. Was connected with the British Gas Company in 1853. At the time that sale took place, was charging 4s. per 1000 feet. Could not recollect how long they had been charging that sum—not so early as 1849. There was a profit made, but not sufficient. It was not entirely in consequence of that the concern was sold to the Commercial. On the 18th of June, 1852, the proprietors of the British Gas Company came to the resolution that the directors should lay out £25,000 in adding new works. Immediately after that resolution, the Commercial Company made the British Company an offer for the concern, and the option lay with the directors to receive £14 or £15 per share, or to pay £5 per share; and they elected to receive, and not to pay. The British Company was on a much larger scale, and made a more extensive distribution of gas than the Deptford Company. Was not acquainted with the amount of gas the Deptford Company were at that moment producing. Should say it would be about 60,000 feet per day. Did not know how many retorts they were using. Supposing them to be manufacturing 60,000 a day at present, in the depth of winter they should make, to keep up the supply, about 100,000 feet per day. Could not say that all the retorts were at work. Did not notice the number. Should prepare for the next winter by putting the retorts in repair. Did not examine the state of the retorts at the works.

Mr. BOVILL: The fact is, they were all new last year.

The UMPIRE: Now, don't you assert a fact against Mr. Logie's hypothesis.

Mr. CREASY: It seems to me to be all hypothesis.

Witness (to Mr. LOGIE): Had stated that 25,000,000 a year can be made with the present number of retorts. There is capacity for putting in six retorts more. Was quite prepared to make gas every day at the rate of 25,000,000 a year at these works. Had not said the works required to be put in a proper state. The apparatus of a gas-work is always more or less out of repair after the winter working, and have to be renovated year after year. Was not very well acquainted with the district, as in other cases of competition in gas. As soon as coalition is possible, competition is impossible; amalgamation, or sale, or something must take place, or an agreement to divide the district in another mode. The process of amalgamation is that of ascertaining the proportional value of the company's apparatus and plant, and agreeing upon the portion of value to be assigned to it; and, dividing the stock by this arrangement, both parties reap the prospective benefits. That is what he called amalgamation. Sale is the transfer of the prospective benefit to another party; and in valuing the concern, he valued those prospective benefits. Competition is always entered into with the hope of profit. When the price is so low that it can't go lower, competition could not exist. Had heard that the Surrey Company was actually in the district, and charging for their gas 4s. 6d. per 1000, while the Deptford Company was charging only 4s. Had not heard that the Deptford Company was making that charge since the Surrey came into the district. Did not think that because the Surrey Company was selling at a higher price than the Deptford, and getting customers at that higher price, that the Deptford Company must cease to exist as a competing company. I should first ascertain what prospect they had of getting through the difficulty. These people will sometimes die a very hard death. Could suppose a company having nearly the whole of a district at 4s. per 1000, and another having but few customers at 4s. 6d. Supplying the public lights would not justify the inference that they had an extensive private custom. Should be astonished to find the company selling at 4s. 6d. supplying as many as the company selling at 4s., and, therefore, did not know what to say about the prospects.

Re-examined by Mr. CHAMBERS.

The quantity of gas sold was, of course, the best test of prosperity. Everybody purchasing looks to the prospective benefit, and takes into consideration a fair, and reasonable, and proper method of managing. Did that in estimating the value of the gas-works. Prospective benefits may to some extent be measured by previous bad management. Had included in his estimate all the benefits that could be fairly brought to bear upon it. Thought the sale of the British works was made on more than fifteen years' purchase. The Commercial paid 6 per cent. immediately after the purchase of the British Company's works, and continue, he believed, to do so. Both companies had acts of Parliament, and went to Parliament for an act of amalgamation. 4s. 6d. was a reasonable price to put gas at. Was inclined to think, when the Surrey Company get this, the charge will be 5s. and 5s. 6d. Thought 4s. 6d. a low price. Thought the amount which he stated the proper selling value for it as a gas establishment. The cost of making the gas he estimated to be 2s. 4·28d. That is the cost of all the gas made. The 25,000,000 feet would cost that sum per 1000. Allowed 17½ per cent. as a reasonable amount for waste. The rental upon 20,625,000 at 4s. 6d., represented by £4640. 12s. 6d., net quantity supposed to be sold, and the cost of production was put down at 2s. 4·28d., which is £2945. 16s. 8d., and gives a net annual profit of £1694. 15s. 10d.

Witness (to Mr. LOGIE): Slow dilapidation, bad debts, and other contingencies involving outlay should be provided for. Looked upon that as a necessary part of the gas company's account. Allowed for all that a reserve of 3d. per 1000 feet. This estimate was formed on his own experience, assessments, and records. Was engaged in the management of works six times the extent of these. The cost of production is increased considerably when the gas is manufactured on a small scale. Corrected the figures of the British Gas Company so as to apply to this case in 1850. The cost of gas to the "British," with all expenses, excepting salary to the directors, was, in 1847, not above 1s. 7d. per 1000. The price was then 4s.

Witness (to Mr. HAWKSLEY): The extent of manufacture was then about 140,000,000 feet.

Witness (to UMPIRE): The British Company had 5000 shares, and the Commercial paid £13 per share for the 5000 shares, and took upon themselves bonds for £50,000.

Mr. CHAMBERS: I think you are a little in error as to that. I understand the bonds were £45,000, making the total £120,000, instead of £125,000. I think it will be found to be so.

Witness: The subscribed capital was £90,000. Besides that, £20,000 was spent on works out of surplus profits. Did not think the amount in bonds and shares was £120,000. Certainly, he took

into account in his calculation the smallness of the works. Was acquainted with the manufacture of gas in a great many other companies beside that with which he was connected. Had opportunities of testing the cost of production in works ranging from £1000 a year rental to £16,000.

John George Hammack Esq. examined by Mr. BOVILL.

Witness: Was a surveyor of very considerable practice and experience in gas manufactures, and chairman of the Ratcliff Gas Works. One of these works was at New Crane, Shadwell, and an upper station in the Commercial-road. Was competent to form an opinion as to the nature of gas-works from practical knowledge, as well as from experience as a surveyor. Knew the site of the Deptford Gas Works from his boyhood. They are extremely well situated for business. It was very notorious that the Surrey Company came into that district, and tried to compete, but had no act of Parliament. Was in Parliament last year, and again this year. Estimated the commercial value of these works, and also the probable produce. Adopted Mr. Geddie Pearse's valuation, with one exception. Deducted from his figures the item for repairs, setting up of mains, &c., £1500. That would be £28,246, less £1500; leaving his estimate £26,746. Had not dealt with it in the way of a compulsory sale. Left that to be decided in the breasts of the arbitrators and shareholders. Was certain that the Surrey Company would immediately realise a sum much equal to the amount he had put upon it. It was a neighbourhood increasing very much. The increased consumption of gas, even in his confined district, was astonishing, and one can scarcely calculate the extent to which it may go. It is very much employed for cooking and other household purposes, and superseding all other lights, perhaps, in consequence of its cheapness. Thought that Mr. Pearse's figures, which he had adopted, did not include 10 per cent. for forced sale.

Witness (to UMPIRE): Had not treated it in the light of a forced sale at all.

Mr. PEARSE: I said I did not treat it in the light of a forced sale at all.

Mr. CREASY: That is all we want to know, Mr. Pearse.

Witness: At the time of the proposed amalgamation between the British and Commercial Companies, there was considerable doubt about the matter amongst the shareholders. He was a shareholder, and convinced them of the propriety of the thing. They adopted the purchase, having satisfied them that they secured the present rental, with a certainty of no competition.

Cross-examined by Mr. CREASY.

Considered it a good bargain for the Surrey. If it joined his district, would like to get it on the same terms. His company were seeking a new bill in Parliament. Lord Redesdale is well aware that the demand for gas is greatly on the increase in every direction, yet he sought to confine them to the district they were in. In the Deptford case there was an area capable of extension. The Surrey Company had their mains in the district, but had not got an act of Parliament. One company is liable to be shut up upon indictment, and crippled in that way. Went upon the calculation that the works are capable of producing 25,000,000 feet per annum. The cost of production he made 2s. 4·28d., the same as Mr. Pearse. Adopted his figures, being satisfied of their correctness.

Re-examined by Mr. BOVILL.

Had no doubt whatever that the figure was correct at which the works were valued. The structural valuation at £20,487, was an independent valuation of his own, made that morning on the spot. Took him about an hour and a half. Had the most of it from information, of course. Measured the land on the plain. The dock is a joint holding, and a mutual accommodation is implied. Agreed with the gentlemen who had been examined, that the structural value is not a proper valuation in a case like this. Had not the slightest doubt in the world that 25,000,000 could be made and consumed, and that 4s. 6d. per 1000 will be obtained.

George Lowe, Esq., examined by Mr. CHAMBERS.

Witness: Was a civil and gas engineer for the last three-and-thirty years with the Chartered Gas Company, and is now their consulting engineer. Had experience in the management of gas-works, and advised and negotiated for the sale and purchase of gas-works; and on the Deptford Gas Works went into the calculation, together with Mr. Barlow and Mr. King, and concurred with them in their opinion of the advantages possessed by these works in regard to situation. His estimate of the commercial value was the same as Mr. Barlow's. Concurred as to the principle on which Mr. Barlow proceeded. The price at which gas can be manufactured up to the point of the station-metre would be somewhere about 2s. 4d. or 2s. 6d., from the peculiar advantage of the situation for getting coals cheaper than many companies. Of the value of waterside property of this kind few can be aware, but those who have not the advantage of it. That has been the case with the Chartered Company. Although they have spent £1,000,000 on their works, they would go to the waterside now if they had an opportunity. The nearer to the waterside, the greater the advantage. At the Deptford Works the barges come right to the coal-yard; thus the expense of cartage is avoided, and heating and wetting. Wetted coals for gas are damaged quite 6d. per ton. Saw the tank; it is a floating-tank. Mr. Hills does not consider it is for the reception of refuse.

Cross-examined by Mr. LOGIE.

Witness: Was at one time lessee of the Black Rock Gas Works at Brighton; held them on lease for seven years; took them in 1832, and left in 1837. The situation was so unfavourable; he only once had his coals beached at Brighton, having always to cart them from Shoreham. Did not know what was the cost of production in the yard. Under the circumstances, it was a very losing concern. That arose from not being able to give proper attention; but that was not the *coup de grace* which caused him to give up the works at the time he took the lease. One of the most eminent engineers of that day, Joseph Hedley, offered him £1000 for his contract. Did not accept it; and the result proved that it had been better for himself and his property, had he given £1000 to be off the lease. Had lived to see the day when, although with gas at 10s. per 1000, George Lowe could not make the thing pay the person who succeeded him, and who superintended the concern, could make 5 per cent. on his money with 6s. per 1000: such are the changes in the horizon of gas affairs. Management is everything. Considered water carriage an immense advantage to a gas company. These works would be of more value to the Surrey than to the Ratcliffe Company. When this agreement was proposed, the Surrey had mains laid in the Deptford district, but could not lay all through it. Was not aware of the situation of the Surrey Company's Works. They have waterside premises on the Thames; but it was a question with him whether coals could not be delivered cheaper at the Deptford Works than at the Surrey Works at Rotherhithe.

Mr. LOGIE: Mr. Croft tells me the reverse is the case. They get the coals cheaper at Rotherhithe.

Witness: Had taken into his account the fact that the Surrey Company had had their mains laid in this district. His calculation was based upon the supposition that there will be no competition. Did not suppose that competition would increase the estimate. There exists an error in the minds of some present as to the producing powers of the Deptford Gas Works. Is positively mystified, and cannot understand what they are, when they talk of one retort making 2000 feet of gas a day. It is stated that the producing powers of these works are only equal to 60,000 feet per day. In some respects, the works are not constructed up to the mark of the present day. Did not find fault with the setting of the retorts; it is after his own plan. The stokers told him they put 1½ cwt. for a charge, which gives only 6 cwt. per day for each retort; at least 3500 feet per day should be made from each retort. Considered it bad work if that quantity was not produced.

The UMPIRE: You see we are still going on a hypothesis.

Witness: Yes, but it is a pity that integers should not be correct.

Mr. HAWKSLEY: Is a horse the worse because his master does not know how to ride him?

Mr. LOGIE: But if the horse has his knees broken by the unskilfulness of the rider, the animal is depreciated very much in value.

Witness: There are companies that profess to make a good profit at 4s. per 1000. Before some of them got into the churchyard, they shall hear of 5s. as the regular price of gas. The cost of production would be from 2s. 4d. to 2s. 6d.; there is no question at all about it.

Re-examined by Mr. CHAMBERS.

Witness: Thought 4s. 6d. would be a very remunerative price; more so, perhaps, than if they were to try to make it 5s. Did not think the parties were so green as to ask 5s. 6d. or 5s. Ascertained the price in the district from conversation with the gasmen; and, further than that, was consulted, about a year and a half ago, by a wealthy man, who intended taking these works; had he put a cheque down for £15,000 he might then have got them. Had said, "Put that ship into good trim, and it will be sold for £25,000." Could bring a moneyed man from Cheapside to back up these facts. That is information not for the present occasion. That was my real sound judgment. Should have been very happy to have shares in it, had he got the money. There would be plenty of bidders at £25,000 or £26,000. The bargain went off; it was a pity it did.

John Frederick Evans, Esq., examined by Mr. BOVILL.

Was the engineer to the Chartered Gas Company. Was manager of the Westminster station, and engineer as well, and thoroughly acquainted with gas-works. Was all his life in that line. Was down that morning to inspect the works at Deptford. Had not gone into the commercial value at all, but merely the cost of making the gas. Thought the gas there would be made at 2s. 3d. per 1000 feet up to the station-meter. Got the figures from experience. That price does not include the directors; it includes officers, rates, and taxes.

The UMPIRE: May it not be convenient to take the actual items from this gentleman?

Mr. CREASY: Give the items.

Witness: Believed the gas would be made at 2s. 3d., and a good deal less. Would begin the items with coals at 16s. per ton, at 9200 feet to the ton; that gave 1s. 8d. per 1000 feet. Wages for carbonising, 2·25d.; purifying, 1·25d.; wear and tear of retorts, 2d.; works, 1·75d.

Witness (to Mr. HAWKSLEY): That was the general carrying on of the works, repairs, and so on. Directors, ·75d.; rates and taxes, 1·67d. The salaries include directors and everything. Altogether these items amount to 2s. 11d.

Witness (to Mr BOVILL): Now the deductions: 66 per cent. of the coke made shall be sold at 10s. a chaldron; that will give 8$\frac{6}{10}$d.; breeze, ·56d.; tar, 1d.; ammoniacal liquor, ·29d. Had not given any credit for the recent stores at all.

Witness (to the UMPIRE): The total is 9·85d.; that leaves 2s. 1d.

Witness (To Mr. HAWKSLEY): For keeping the works in good repair, put down 2d.; that made it 2s. 3d. This he supposed to be the cost at Deptford, under good management.

Cross-examined by Mr. CREASY.

Fixed the price of coal at 16s.; believed they could be got for less now. Thought last June the coals cost about 19s.; that was an extraordinary year. In this case there would be no lighterage; the vessels would come alongside. If they employed small vessels, they could get them into the creek, and unload them at once; and that price would cover it. Adopted 10s. as the price for coke, because he thought that was the average price all the year round. Did not give the price obtained at his own works, but those at the Deptford. His own price would be much higher. Many of the figures represent what he was doing at his own works; the wages for instance, and wear and tear of retorts. His works were a hundred times larger than these. In many small works, like this, the wages are in many cases much less than on a large scale. Could give several instances. Was at the works to-day; remained there three-quarters of an hour. Mr. Lee, and another gentleman who had been examined to-day, were also there.

Re-examined by Mr. Bovill.

Witness: In small works, it is an advantage that one man should be able to look after everybody; that would lead to decrease rather than to increase the amount of wages. Would get plenty of persons to supply coals all the year round at 16s. per ton. Last year was an exceptional year.

Witness (to Umpire): Had contracts for coals only from year to year. Some coal contractors will go for two or three years. Last year they were so bitten, that few of them would go for a long time.

Mr. *Josh. Liddiard* examined by Mr. Chambers.

Was a surveyor at Deptford. Made a plan of the work; the measurements are accurate, according to scale (the plan was produced, and marked P); it was a block plan. Was also parish surveyor of St. Paul's and St. Nicholas, Deptford, and therefore well acquainted with the portion of these premises that was in the county of Kent, the district in which that company supplies gas: lived in it during the last twenty years. There were very few premises indeed, with water access, in that neighbourhood to be disposed of. In that respect, this plot of ground is very valuable indeed. The dock-yard, victualling-yard, and other places, take up pretty well nearly the entire river frontage at Deptford. Knew of no freehold property whatever, that is waterside now, that can be purchased. As a surveyor, estimated the commercial value of the plot of ground on which the gas-works were erected at £5040, to be used as gas-works; that was a fair figure. Looking at it as to be used for wharfing, and matters connected with it, reckoned it £180 per annum, and at 28 years' purchase; that is a proper number of years. Knew the neighbourhood well; there had been a considerable increase in the number of houses. Since the commencement of the war there has been less, but the increase has been general. Knew the actual number; on an average there has been thirty new houses every year these last eight years—dwelling-houses, cottages, and large houses. Would not suppose that figure represented gas consumers. Many of them would be, and are, gas consumers. There was a great deal of land yet to be made use of for building—a large portion of the Evelyn estate, and the Drake estate. The Drake estate had finer and larger houses on it; and they are gas-burners to a considerable extent.

Witness (to the Umpire): In his estimate, assumed a freehold title. If there were a joint-tenancy, would make no difference in the value. The accommodation is simple. Either party can use it at any time. Though there be a joint use of that dock, it is sufficient for both parties, and equivalent to the advantage of exclusive use.

Witness (to Mr. Hawksley): Took it in comparison with other properties in the neighbourhood—not with reference to size, because in other instances property has sold for a considerably larger sum in comparison with it.

Cross-examined by Mr. Creasy.

Had known the neighbourhood a long time—about 20 years. Recollected the plot on which the works were these 15 years, but never knew a right of way. Before the Greenwich Company came, it was an open piece of ground, and thistles were growing there. Mr. Hills' chemical works existed at that time; the premises were then occupied by a Mr. Benneky. Never knew it as a dock. Until very recently there appeared a sort of hollow in the bank. Knew it to be used as a dock 15 years.

The plan being produced,

Witness: Originally coloured the space (pointed out) pink, to denote it as part of the property. Included the three covered pieces in his valuation. It would be useful for stowage. Took it from an original tracing of the map of the property, from a plan of the deeds given to him by Mr. Sandom. Had the tracing with him. (Produced it.) Was given to him to show the property—to point out the land he was to go and measure. That marked across it was an ancient footpath. It would be between the coal-store and the dock. It came to the edge of the coal-stores.

Mr. Bovill: Understand this: We sell, subject to whatever rights there are; and if they like to try and make out that the public have a right to go there, they can do so. That does not affect our marketable value of the works.

The Umpire: An ancient path through your gasholder would materially affect the value of your scheme.

Witness (to Mr. Creasy): The plan was given to him as a general configuration of the land. Had adopted a different scale. Such marks did not denote a footpath; they merely drew attention.

The Umpire: What has been taken down is, "There were some dotted lines or tracings, which were given to me, and which I now produce."

Mr. Creasy: "And which, I was told, represented a footpath."

Mr. Bovill: No.

Mr. Hawksley: Do I understand that this was once the property of the Railway Company.

Mr. Chambers: Yes, originally.

Mr. Hawksley: May not all these roads, if they ever existed, have been stopped under the powers of the Railway Company.

Mr. Bovill: I am told there is nothing but manufactories, and nobody could go there.

The Umpire called on the short-hand writer to read from his notes.

Witness (to Mr. Creasy): Called it an ancient footpath, because there was a road there, and had been represented to him as a footpath all round by a very old inhabitant. Had not asked Mr. Sandom about it. The tracing was given to him by Mr. Sandom, as taken from the deed. Included the whole of the dock in his valuation. Took it at an area. Considered the site as freehold. Saw no tank lying there when he was taking the measurement of the land. Took the measurement 8 or 9 days ago.

The Umpire: Mr. Liddiard, you distinctly told Mr. Hawksley that you did not take it by measurement.

Witness (to Mr. Creasy): Could not show anything on the tracing representing the dock.

Witness (to Mr. Hawksley): There is no path crossing the railway.

Witness (to the Umpire): A person following that footpath would have to go through the wall, or over it. Should say that the line of the footpath goes straight through the external wall of the premises, but could not say to a foot or six inches. Had been many times on the premises; the dotted line, starting from the railway in the direction of the works, cuts the external wall of the gas-works. Following it through the wall, it leads the entire length of the building to the adjoining premises up to the wall. The external wall and Mr. Hills' premises were built long before he knew the place.

The Umpire: The possibility of the right of footpath is subject to the inconvenience of going through the wall.

Mr. Creasy: If there be a right of footpath, that gives a right of pulling the wall down, which makes this point exceedingly important.

Witness: Was parish surveyor. The amount at which these premises were rated was no criterion of their value.

Mr. Chambers objected to his deposing at what they were rated, in the absence of the parish books.

Witness (to Mr. Creasy): Never rated the premises. They were in the parish books previous to his appointmoent.

(The tracing was put in, and marked No. 2.)

Re-examined by Mr. Chambers.

Witness: Was a consumer of the Deptford gas. Had consumed no gas previous to the last twelve months. Took the space of ground he looked at into account as a whole, and with its present use as an original letting or taking. If the imaginary footpath were covered on towards the railway, it would go against the wall of the railway. It comes from nowhere, and goes to nowhere. There are other works and factories beyond Hill's.

Mr. Hawksley: Supposing the company did not possess this dock, how much would you deduct from the value?

Witness: It would be useless as a wharf.

Mr. Chambers: Take it that they have a right of use.

The Umpire: What is the difference between having a right of use and its being their freehold, and including the footpath? You valued the dock as their freehold. Suppose it was not, and that there was a joint-tenancy and right of way over this, what deduction would you make?

Mr. Bovill: We shall prove conclusively that was made over to us, and that Mr. Hill has no claim.

The Umpire: Mr. Barlow spoke without any plan of a retaining wall. There were some cross-examinations as to the quantities. I should suggest that Mr. Barlow now point out that wall to us on the plan.

Mr. Barlow did so.

Mr. *Hall* recalled.

Witness (to Mr. Hawksley): The £1000 stated to be written off by him is written off in the book, but not taken into account by Mr. Broome. He had taken it into account. Had fitted the other side to the extent of £100; that they had not taken off. It was charged to profit and loss. Had not altered the figures in the book throughout. It was the only entry in the book that he should have to interfere with.

Witness (to Mr. Creasy): Had followed the books, though not the form of accounts. Had adhered to the facts of the books.

(*To be continued.*)

[The arbitrators being unable to agree, the umpire made his award on April 29th, finding the value of the undertaking to be £20,878. On April 24th, the Surrey Company filed a bill in Chancery to restrain the Deptford Company from all further proceedings in the matter. This bill was dismissed by Vice-Chancellor Wood on June 20th, after two days' adjournment. An appeal was made to the Lords Justices; and, after having been several times before the court, the parties ultimately agreed, on the 7th instant, to an order declaring that the plaintiffs were entitled to have a good title shown to the property comprised in the agreement of June 1, 1854, according to the nature of such property, or to have compensation for any diminution in the value of the property, in consequence of such title not being shown; the plaintiffs to pay the costs, and £164. 14s. 8d., half the costs of the award; both sides consenting to let the award be opened, and subjected to re-consideration of the umpire: that the agreements for reference and award be further enlarged until October 1, 1855, or further time, as the court shall direct: and, further, the plaintiffs and defendants consenting to abide by the order of the court, if any difficulty occurs in the progress of the reference by reason of death or the umpire not acting, let the plaintiffs and defendants be at liberty to proceed jointly with the bill now before Parliament; the arbitrators and umpire to resume and continue their proceedings according to the agreement, and to ascertain and determine whether the title shown, or which may be shown, by the said defendants to the property comprised in the agreement, having regard to the nature of such property, is, as to all or any, and what part of such property, defective, &c.; and to award and determine whether the sum of £20,878, or any greater sum, or any sum not less than £16,500, is a fair commercial value for defendants' undertaking, &c. We have a full report of these important proceedings in type; but the impossibility of sufficiently condensing it to bring it within the space we can devote to it, compels us to defer its publication till next month.]

Miscellaneous News.

SOUTH ESSEX GAS AND COKE COMPANY.

An Extraordinary General Meeting of the Shareholders of this Company was held on Wednesday last, at the Chequers' Inn, Walthamstow, at seven o'clock in the evening, for the purpose of receiving a report from the directors as to the present state of the company's affairs, and to adopt such resolutions thereon as might seem to them expedient. Amongst those present we observed the following gentlemen:—Wm. Cluff, Esq., chairman; John Downes, Esq., Rev. G. Pocock, G. P. Pocock, Esq., Lemon Hart, Esq., John Drake, Esq., Owen Tucker,

Esq., Ebenezer Clarke, Esq., — Sinden, Esq., Messrs. William Cluff, C. Cluff, W. M. Stears, &c.

It having been provided in the deed of settlement that the proceedings of any meeting of the shareholders would be invalid unless 25 were present, and only 24 being in attendance, the business did not commence till ten minutes past eight o'clock, when Mr. Cooper, innkeeper of Walthamstow, arrived, and made up the requisite number. Subsequently the attendance was far more numerous; and, in fact, the meeting was the largest yet held.

WILLIAM CLUFF, Esq., chairman of the board of directors presided.

The SECRETARY having read the circular convening the meeting,

The CHAIRMAN said, it was nearly twelvemonths since he had the pleasure of seeing them. Their affairs had been surrounded in some degree with difficulties, but he was happy to state that everything was now in a fair way for an amicable arrangement. What was required now to render the undertaking profitable was, that more shares should be taken, in order to place in the hands of the directors a working capital.

Mr. Alderman WIRE, solicitor of the company, then read the following report:—

"This company was established in the year 1852. Soon after its commencement, it was thought prudent to connect it with another company then just forming, called the Walthamstow Gas and Coke Company; it having been thought by the promoters of both companies that, while one company was sufficient to light the entire neighbourhood, and yield a fair dividend to the shareholders, the two companies struggling with each other would produce no profit. Accordingly, an amalgamation took place, some of the shareholders of the Walthamstow Company being paid off, and others accepting shares in this company, in lieu of those shares which they held in the Walthamstow Company.

"Simultaneously with the negotiation for the amalgamation of the two companies, the promoters of this company were actively engaged in securing an eligible plot of ground on which those works were to be erected; in obtaining the consent of the parochial and highway authorities to lay down the pipes; in canvassing for customers; and in endeavouring to dispose of the shares amongst the parties resident in the neighbourhood.

"The promoters obtained an eligible site of ground near the Lea-bridge, on lease from Mr. Warner, at a favourable rent, £90, and for the term of 99 years; but, after struggling for some time to obtain sufficient capital to complete the work, they failed in so doing: and they then entered into a contract with Mr. Stears for the erection of the works and laying down the pipes, he agreeing to accept payment for his contract, part in money, part in shares, and part in debenture bonds.

"The directors, however, did not succeed in getting sufficient money to pay Mr. Stears as he went on with the works; and consequently, instead of extending the works, as they originally intended, a stop was put to the further extension; and Mr. Stears has, at the request of the directors, gone on lighting the district for which the pipes have been laid.

"The directors, however, in order to fulfil their contract, and carry out the works, borrowed money from the Mitre and the Ægis Assurance Companies, in 'the fond expectation' that the shares would be sold, to enable them to repay the amounts, and to complete the contract for lighting the whole district. In this expectation they have been disappointed, and, consequently, the extension has not been made; and it appears that the whole concern must be broken up, unless the inhabitants, who will be benefited by the company, are prepared to support the directors by taking shares, and those shareholders who have not paid up do so forthwith.

"With a view to place the matter before the shareholders, the committee have consulted some of the principal of them, who recommend the meeting to be called; and it is expected that they themselves will set the example of assisting the directors by taking shares.

"The directors have been earnestly engaged in ascertaining the claims upon the company, and they have great satisfaction in reporting, that they have come to what they consider most favourable terms with Mr. Downes, Mr. Tucker, and Mr. Stears. The two former acted as solicitors of the company in its formation, and almost down to the present time; and the latter is the contractor who erected the works, and agreed to take a lease of the same when finished, at a rent equivalent to six per cent. on the subscribed capital of the company.

"Mr. Tucker generously forgives any claim that he may have for his professional services. The claim of Mr. Downes amounts to £1250, which included the payments to the Walthamstow shareholders, to settle with them; and he has reduced it to £750; and, because he believes that the company will ultimately pay a good interest, he has agreed to take the amount in paid-up shares. There were considerable difficulties respecting the claim of Mr. Stears, he asserting that it would amount to a very large sum, and the directors disputing the claim; but they, believing that litigation would cost more than the amount disputed, agreed to give to Mr. Stears £250 for engineering services performed, and £750 as the balance due in full for all claims; these two last amounts also to be taken out in paid-up shares. It is unnecessary to add, that these arrangements are conditional upon the company going on. If it does not, each of those parties to be remitted to his original rights.

"It only remains now to state that the capital of the company is £6275, in 1225 shares; that of this sum £2400 has been paid upon 480 shares; and that there are 323 shares upon which a call only of £270 has been paid; and, consequently, there remains £1408 to be paid up on these shares, and which, if the company proceed, will be immediately called up.

"That 193 shares were voted to the directors, who, for a long time, had not any fees for their attendance. It is expected that the gentlemen to whom these shares have been voted will, if the company goes on, either surrender one-half their shares or pay the amount due on them, the same as other subscribers.

"The balance-sheet,* which will be read after this report, will show the exact financial condition of the company at the present time, and will enable the shareholders to see that, if unanimity prevails, and the original amount of shares is subscribed, the works of the company can be easily finished; and if finished, and the whole district lighted, the promoters and directors believe that it will, within twelve months after completion, pay a good dividend.

"The directors suggest that it will be prudent to change some of the directors, and to make an addition to their number. It is believed that Mr. Urquhart, Mr. Stears, and Mr. Tucker are willing to retire; and if three gentlemen, residing in the neighbourhood, well known for their respectability and business habits, are nominated by this meeting, there can be no doubt that more confidence will be created, and the company become prosperous. It is right to add, that if these agreements are carried into effect, Mr. Stears will immediately deliver possession of the works, and all parties will agree to execute mutual releases, so that there shall be an end of all claims and litigations respecting them."

Mr. TURNER wished to know whether, at the meeting when the 193 shares were awarded, there was a sufficient number of proprietors present to render the meeting valid?

Alderman WIRE: No doubt of it. There was a general meeting held on the 3rd of January, 1854. It was duly convened, and a sufficient number present to make it a legal meeting.

Mr. TURNER: I was present at that meeting, and I know there was not a sufficient number of proprietors there to constitute it a legal meeting.

Alderman WIRE: I don't know how that may be, but there is more than sufficient here to constitute a legal meeting.

Mr. DOWNES: There can be no question that there was a sufficient number at the meeting to constitute it a legal meeting.

Mr. LINDEN: There were not more than five or six proprietors at the first meeting.

* No balance-sheet was read.

Mr. DRAKE: Has there ever been a legal meeting at all? (Hear.)

Mr. TURNER: I cannot understand, whether the meeting was legal or not, how gentlemen could award themselves 193 shares without the sanction of the company at large.

Alderman WIRE said, it was stated in the report that the gentlemen who got those 193 shares would be called upon either to surrender them or pay on them like every other shareholder. It should be understood, however, that certain fees were due to the directors for attendance; and if they were not to possess those shares, which were given in lieu of fees, then the directors would be entitled to remuneration in another way for what they had done.

Mr. TURNER: I want to have a plain matter of fact explained, and want to know whether those 193 shares were legally awarded.

Alderman WIRE: I presume they were, because they are entered in the minutes, and the minutes of that meeting were confirmed at a subsequent meeting.

Mr. TURNER: But that meeting was not a legal meeting.

Alderman WIRE: Well, that I cannot tell. However, you need not now confirm that part of the report. You may leave the propriety of appropriating those shares open to future adjustment.

In answer to a PROPRIETOR,

Alderman WIRE said that Mr. Stears had invested £4000 or £5000 in shares, in work and money. After some negotiation, they had agreed to give him a certain consideration to execute a release, and give up the works. All the actual money paid by the shareholders was under £3000. The money actually expended on the plant was £5527.

Mr. DRAKE: So that we are now in debt between £2000 and £3000.

Alderman WIRE: We have to pay the Ægis Company and the Mitre Company £1168. 13s. 9d., and for stationery £103. 12s. 4d., and there is a bill of exchange out for £250. That is all we have to pay, because Mr. Downes and Mr. Stears are willing to accept payment in shares.

The CHAIRMAN: Then there is £938 of unpaid calls. An eminent engineer has informed us that the works, at a fair valuation, are worth from £4000 to £5000.

Mr. DOWNES: Perhaps it may save a great deal of discussion if you permit me to state that an eminent gentlemen, well acquainted with gas transactions, is ready to come forward and pay off the loan of the Ægis and Mitre, and lay out £3000 more for extensions—that £3000 to be paid by £1000 in shares and debentures, and £2000 in cash. Now, by accepting his proposal, you will be relieved of the £1300 which you owe, and you will be enabled to place the undertaking in a prosperous position; and he proposes that some authority should go forth from this meeting (in the shape of a committee, perhaps) to make the necessary arrangements. If the company is to go on, it is quite clear that those extensions must be made. It is the shortness of capital that has hitherto placed the company in difficulties. To show the company that the works will pay, he offers to take a lease—he takes a similar view to the one I take—and to give the shareholders one-third of the gas rental, and one-third of the rent of the land, and *bonâ fide* security for £11,000. He says an additional outlay of £3000 will produce an additional income of £2100.

The CHAIRMAN said he had looked minutely that day into the accounts, and found that for the extension of works, the erection of premises, and the purchase of coals, they wanted at least £4800. Mr. Downes' account was reduced to £750. Mr. Stear's account was also reduced to a reasonable amount. He had consented to take, of what is due to him, £1000 in shares. There was now only £1300 to be made up; and when the unpaid calls were collected, that sum would be reduced to £400. If the necessary capital for extensions were now subscribed, the concern would be profitable to them all.

After some conversation,

Mr. DOWNES said, the question for decision now was, whether the company would raise the capital required, and work the plant themselves, or lease it to somebody who would do so.

Mr. DRAKE said that it appeared they were greatly in debt, and that they had a great number of merely nominal shareholders, who had not paid up; and to ask parties who had paid up to subscribe further, would be unfair. He thought this whole question should be probed to the very root. Mr. Downes' bill was very large, and required examination. In fact, the company had gone too deeply in debt with lawyers. That was one evil the shareholders ought to go to the root of. The accounts should be all minutely scrutinised. They should expunge those who were not liable for the shares they held; and those who were liable should be made up. It was ridiculous that any part should be allowed to come in after the company had been fairly set afloat, and without risk enjoy the advantage of other people's exertions.

Alderman WIRE did not wish to say that any was a defaulter, for the directors were chary of asking the shareholders to pay, when there was an apprehension of the undertaking being discontinued. Now, however, having arranged with all the creditors of the company, there was no difficulty in asking the shareholders to pay up the calls. With respect to the 193 shares referred to, it would be a matter of inquiry whether they were legally voted, and if not, the holders would be required either to surrender them or pay upon them. If something were not done at once to put the undertaking on a proper footing, they would have to go into the Court of Chancery, and be wound up.

Mr. DRAKE said they had a large sum of money to make up, and it must be raised in some shape or the other. He approved of Mr. Downes' proposition, and if any gentleman brought forward a resolution to that effect, he should be happy to second it.

Mr. HART thought that was the only plan that could be adopted.

Alderman WIRE: I think so.

Mr. SINDEN: Are we liable beyond the amount of our shares?

Alderman WIRE: Yes.

Mr. SINDEN: Mr. Downes said we were not.

Alderman WIRE said, that when Mr. Downes made that statement he did so in accordance with the opinion of ten or twelve of the most

eminent men at the bar. An act for limited liability was now before Parliament, and all doubt upon that point would be soon removed. He thought it would be much better for them to carry on the works themselves, as, if they lease them, the contractor would take the largest share of the profits. He hoped, therefore, that those present would take more shares themselves, and induce others to do the same.

Mr. CLUFF jun., thought the matter should be left entirely to the directors, and that a committee was unnecessary. £2000 would be sufficient to enable them to carry on the undertaking with profit, and it was better for them to subscribe that sum than to lease the works.

Alderman WIRE said, the object of appointing the committee was that they might inquire into the best mode of carrying on the undertaking. The decision of the committee would not at all bind the company, but it would materially assist in forming an opinion as to the proper course to be pursued. He had drawn up the following resolution, which he hoped some gentleman would move:—

"That the solicitor be instructed to procure the payment or abandonment of the 193 share taken by parties who have not paid on them; to obtain payment from the shareholders who have not paid; and to ascertain what new shares will be taken. And also to ascertain whether it is desirable to grant a lease of the works to any; and, if any, to what parties, and upon what terms; or whether a sufficient capital can be raised to enable the directors to carry on the works and make the extensions without granting a lease; and to report to another meeting, to be held here on the 18th of the present month, at the same hour."

Mr. CLUFF moved and Mr. HART seconded the resolution, which, after some desultory conversation, was unanimously agreed to.

The following gentlemen were then appointed as a committe, to carry out the objects of the resolution:—The Chairman, Mr. Ebenezer Clarke, Mr. Lemon Hart, Mr. John Drake, the Rev. Mr. Pocock, and Mr. John Downes.

The meeting then adjourned till the 18th inst.

ORIENTAL GAS COMPANY.

An Extraordinary General Meeting of the Shareholders of this Company was held on the 2nd instant, at the London Tavern, Bishopsgate-street, to receive the special report of the directors, recommending that arrangements be made for extending the operations of the company to Madras, Bombay, and other places, in accordance with its original design; and for that purpose to authorise the increase of the capital of the company to £300,000, by the creation of 50,000 new shares of £1 each, upon the allotment of which a deposit of 2s. a share would be required to cover preliminary expenses—the new shares to be issued *pro rata* to the present shareholders.

Captain BARBER presided.

The SECRETARY read the advertisement convening the meeting.

The CHAIRMAN then read the following report:—

"In conformity with the deed of settlement, the capital of this company can be increased from time to time, with the consent of the shareholders, as circumstances shall require it, till it reaches £300,000. On the formation of this company, £50,000 was the sum considered to be sufficient—firstly, to obtain the confidence and recommendation of the East India Company; and, secondly, to ensure the patronage of the Supreme Government of India. The result has proved the correctness of this view. The £50 subscribed will be required to carry out the contract as at present entered into with the municipal authorities, under the directions of the Governor-General in Council. Your directors are of opinion that the time has arrived for negotiation with the Governments of Madras, Bombay, and Agra, in order to secure from them privileges and immunities similar to those which have been granted to this company by the authorities in Calcutta. Should contracts which your directors can recommend to the shareholders be the result of these negotiations, your executive will at once proceed to carry out the undertaking, as it may be, under one or other of the Governments; but the directors will not enter into any contract, unless it present undeniable evidence that the outlay will be profitable to the company. To make the preliminary surveys and estimates will require an expenditure; and it is to provide the necessary funds, and ultimately capital, that the directors now ask the sanction of the shareholders to issue £50,000 additional shares of £1 each, on which they propose at present to make a call of 2s. per share, giving the pre-emption to the holders of original shares."

The CHAIRMAN, having expressed his readiness to answer any questions, moved that the report be received and adopted.

Mr. BROWN seconded the motion.

In answer to a question from a PROPRIETOR,

The CHAIRMAN said, when this company was originally formed, that question was carefully considered by the promoters of the undertaking. Taking a comprehensive view of the subject, the promoters of the undertaking thought it would be more in accordance with the interests of the shareholders to call the company the Oriental Gas Company, and they took powers in their deed to light any place from the Cape eastward; but, after they had been completely registered as a company, it became politic to secure the patronage of the East India Company. Accordingly, we waited on the directors of the East India Company, and stated who were our shareholders, and the amount of capital subscribed. We then asked for special immunities and privileges, to enable us to carry out the undertaking with success. After much discussion, the directors of the East India Company stated that it was a mere bugbear to suppose that so small a sum as £50,000 would be sufficient to light India with gas. We admitted this; but we observed that our object was to take one place first, and, if the East India Company would grant us certain immunities and concessions, so as to enable the shareholders to derive a fair profit from the amount of capital invested, we would then light some other part of India. We also stated that we had the power of raising capital to the amount of £300,000. After we satisfied the chairman and board of directors that we were a responsible body, capable of faithfully carrying out what we had undertaken, they were kind enough to say—and they reiterated their statement in a letter—that they would recommend the Supreme Government of India and the Governments of Madras and Bombay to give us every assistance in their power.

A PROPRIETOR: Will the 2s. a share cover all expenses?

The CHAIRMAN: Yes; we pledge ourselves to that.

Mr. MASSON wished to know if the directors had received any precise information as to the rate at which they could obtain coal at Madras and Bombay. When the Australian Gas Company was established, they took the same wide field as the Oriental Company; but, in the first instance, the most prudently confined themselves to Sydney, as it was the only locality in Australia then known to possess coals. Since then a separate establishment sprung up at Melbourne. If the Sydney Company in the first instance attempted to grasp at Melbourne, they could not have accomplished their objects; and he hoped the Oriental Company would profit by their example.

The CHAIRMAN: The valuable suggestions of Mr. Masson have not escaped the attention of the directors. We want money to meet the preliminary expenses. We do not think ourselves warranted in expending any portion of the £50,000 in making the necessary inquiries as to what is to be done in Madras and Bombay.

Mr. BROWN, in seconding the resolution, said he was glad Mr. Masson had remarked on the difference between Sydney and Melbourne, and showed that the same company might be encouraged in one town and discouraged in another. But the Oriental Company was exactly the reverse of the Sydney Company. As the chairman had stated, the company were merely bound to the chairman and directors of tke East India Company to inquire how far they could invest the future capital of the company in the lighting of other towns besides Calcutta. The directors felt it would be prudent to commit themselves only to Calcutta, and they had happily found that the lighting of that place would be an exceedingly profitable undertaking. They had discovered that there would be a great demand for gas, and that the project had been welcomed almost universally. It now became a question whether they should confine their operations to Calcutta. It was necessary to make inquiries in Madras, Bombay, and other places, as to the probability of success. They must ascertain whether the people of Madras wanted light, and, if so, whether they would pay a remunerating price for it, and what would be the cost of production.

Mr. DEW, said he was quite ready to leave everything with confidence in the hands of the directors. Suppose this preliminary investigation turned out favourable, and that they were inclined to carry out the idea, in what position would the shareholders of the new undertaking stand with respect to the existing proprietors? At present they had a paid-up capital of £50,000, on what turned out to be not only a judicious but a fortunate investment. Now, suppose the new undertaking turned out not to be so profitable, in what position would the two classes of shareholders stand relatively? Would the new shareholders partake of the general profits?

The CHAIRMAN said he was much obliged to Mr. Dew for his frankness and candour. The directors wanted to make a call of 2s. a share, on 50,000 new share. This would give them £5000, but they did not intend to spend the whole of that sum on inquiries. They would exercise the utmost economy in the proceedings, and an account would be rendered to the shareholders. If they succeeded, they would call in the 18s. additional, and that, with the other £50,000, would form one capital, but under two distinct accounts.

In answer to a PROPRIETOR,

The CHAIRMAN said that parties in India were very chary in taking shares, unless there was a limited liability, as they had already burned their fingers in other commercial speculations. The natives who had taken shares would not pay upon them till the charter now before Government for limited liability was granted.

Mr. DEW suggested the propriety of pursuing the same course with respect to the consumers in the new towns that had been adopted in reference to the consumers in Calcutta—namely, shares should be reserved for them till the law of unlimited liability was enacted.

The CHAIRMAN said all these details would be considered.

Mr. BEATTIE: You have now stated that, in the event of 50,000 more shares being created, a certain sum will be expended in making inquiries respecting the other Indian towns; but I suppose the directors may make an additional call if they think it necessary?

The CHAIRMAN: Yes, with the consent of the shareholders.

Mr. BEATTIE: Had you any letters by this day's mail from India?

The CHAIRMAN: Yes, one short one, which is very satisfactory.

The report was then unanimously adopted.

Mr. W. C. HARNETT then moved:—

"That the capital be increased to £100,000 by the issue of 50,000 new shares of £1 each, on which a deposit of 2s. per share shall be paid."

Mr. POWELL seconded the motion, which was unanimously agreed to.

Mr. C. MORRIS, director of the Australian Bank, moved:—

"That the new shares be issued *pro rata* to the present proprietors by the directors, in the manner provided by the deed of settlement; and that the directors be authorised to make such arrangements as they may consider expedient with reference to the payment of the remaining amount of shares."

Mr. FAWCETT suggested the propriety of leaving the directors a large discretion. He thought the inhabitants of India should be entitled to the same privileges with regard to the issue of shares as the people of England. They had a contract for Calcutta, but no contract for other places; and, notwithstanding the resolution might turn out, on inquiry, that it would not be profitable to light Madras or Bombay, the Indian people, he thought, had the same right as the English to the new shares. The natives of India had taken their shares conditionally, for they had in their minds the state of the Union Bank of Calcutta, and they hesitated to pay on their shares until they had the security of unlimited liability. In a few days, however, they would have a charter of incorpororation, with limited liability; and then the company would receive ample support from the people of India. As these people were putting 20 per cent. into the pockets of the shareholders, it was but right they should have the privileges of English proprietors.

A PROPRIETOR said, he thought the resolution was calculated to fetter the discretion of the board of directors.

Mr. BROWN said, it was impossible, in this preliminary debate, to go into all the details. They were at present only a court of inquiry. It was not improbable, as a gentleman observed, that they might not light Madras or Bombay, but then they had a wide field of enterprise open to them; they had Agra, Myrzepore, Cawnpore, Benares, and Delhi; and if they were thoroughly convinced of the propriety of lighting those places, he was sure the shareholders would be but too happy to extend the capital to £300,000.

The motion was then agreed to; and, a vote of thanks having been unanimously accorded to the chairman, the proceedings terminated.

Price Current.

CASTINGS, per Ton.
Average Weight of Cast Iron Gas Pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in.	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lbs.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow	Newcastle.	Wales.	Yorksh., Derbysh., and Staffrdsh.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Pig Iron, No. 1	4 10 0	3 15 0	4 0 0	—	—
1¼ and 2 inches Socket Pipes	8 0 0	7 5 0	7 10 0	8 0 0	7 10 0
2½ and 3 do. do.	7 15 0	7 0 0	7 5 0	7 15 0	7 5 0
4 and 5 do. do.	7 10 0	6 15 0	7 0 0	7 10 0	7 0 0
6 inches and upwards do.	7 5 0	6 10 0	6 15 0	7 5 0	7 0 0
Retorts, 2nd fusion, hot blast	7 0 0	..	...	...	6 15 0
Do. 2nd fusion, cold blast	7 10 0	6 5 0	7 5 0	7 10 0	7 5 0
Tank Plates, ⅜ thick and above	7 15 0	6 10 0	7 10 0	7 15 0	7 10 0

COALS.

NEWCASTLE. Unscreened.	s.	d.		SCOTCH CANNEL.			
Whitwell Primrose	7	6	per ton.	Boghead ....at Leith	28	0	,,
Pelton	8	0	,,	Kirkness.....best	23	0	,,
Medomsley				Capeldrae, first quality	20	0	,,
Pelaw	8	3	,,	Ditto, second quality	12	6	,,
Burnhope				Lesmahago at Glasgow	25	0	,,
Eighton Moor				Ditto at Leith	27	6	,,
New Pelton				Arniston	22	0	,,
Peareth	8	6	,,	Wemyss ...(at the pits)	16	0	,,
South Pelaw				Bridgeness	17	0	,,
Washington Hutton				Kinneil			
South Peareth				Knightswood	18	0	,,
Ramsay's Cannel	18	0	,,	Lochgelly	19	6	,,
Cowen's Cannel	18	0	,,	Lumphinan			
				Methill	11	0	,,

FIRE GOODS.
Best Bricks, 60s. per 1000, at Newcastle.
Do. Clay, 14s. per ton do.

LEAD.
Soft pig, £23 to £24 per ton.

WROUGHT IRON TUBING, subject to 35 per cent. Discount.

	2 inches.	1½ inch.	1¼ inch.	1 inch.	¾ inch.	½ inch.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent welded tubes, from 2 to 12 feet, per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ..... ,, 6 in. to 18 in., each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting pieces, or long screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, springs, and elbows, wrought iron	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, wrought or cast	4 6	3 0	2 6	2 0	1 6	1 2
Iron cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing sockets, caps, plugs, and nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain sockets	1 0	0 8	0 7	0 5	0 4	0 3
Flanches	1 9	1 6	1 3	1 0	0 9	
Syphons, 2 quart	15 0	14 0	13 6	13 0	12 0	
Ditto 1 quart	11 6	10 6	10 3	10 0	9 6	

FREIGHTS, per Ton.

Coastwise—Newcastle.		*Foreign.*	
Chatham & Roches.	7s. 6d	Boulogne	9s. 6d
Cork	11 0	Barcelona	32 0
Dover	7 9	Bordeaux	19 0
Dublin	11 0	Cadiz	18 0
Exeter Quay	10 0	Calais	9 6
Folkestone	8 0	Constantinople	39 0
Hastings	10 0	Dieppe	10 6
Jersey	9 0	Genoa	33 0
London	7 9	Hamburg	10 6
Lowestoft & Yarmth	5 0	Havanna	30 0
Lynn	7 6	Havre	10 6
Margate	8 6	Leghorn	33 0
Portsmouth	9 0	Lisbon	16 0
Plymouth	9 0	Rotterdam	10 0
Whitstable	7 9	Stettin	13 0
Weymouth	9 0	Trieste and Venice	40 0

Advertisements.

WALTER MABON,
ENGINEER.
ARDWICK IRON WORKS, FAIRFIELD-STREET,
MANCHESTER,
Manufacturer of
IRON TANKS for Gasholders, Railway Stations, &c.
GASHOLDERS.—Extensive premises at Gorton, solely for the manufacture of Gasholders, and other heavy Wrought Iron Structures.
GAS APPARATUS.—W. M. has an extensive assortment of patterns for Purifiers from 4 feet to 15 feet square, also round ones from 4 feet to 10 feet diameter; Scrubbers, Condensers, Washers, Columns, Girders, and Tripod Patterns, suitable for Gasholders, from 10 feet to 150 feet diameter, either Singlelift or Telescope. Contractor for Gas Works of any magnitude. Designs, Specifications, and Estimates furnished.
WROUGHT and CAST IRON ROOFS for Railway Stations, Gas Works, Warehouses, and Sheds, prepared for Slates or for Corrugated Iron.
IRON HOUSES, either for Dwellings, Manufactories, or Public Buildings.
PIPES and VALVES, for Gas and Water, from 2 inches to 48 inches bore.

ANDERSON'S
DOUBLE-ACTING PISTON EXHAUSTER
is the most simple and effective machine of the kind made. It gives no appreciable oscillation or slip; works with extremely little friction; and requires no internal lubrication.
These Exhausters are in operation both in London and the Provinces, pumping from 10,000 to 70,000 cubic feet of gas per hour. They occupy very little space, and may be set either perpendicular or horizontal.
Particulars of price, &c., may be had on application to Mr. ANDERSON, at the Gas Works, Rotherhithe LONDON.

H. JONES, Gas Meter Manufacturer,
No. 41, OLD-STREET, St. Luke's, London, begs respectfully to call the attention of Gas Companies to his latest improvements in the WET METER, by means of which water cannot be abstracted, neither can Gas by any possibility pass through the Meter without registering.

M. KELLY, Cast Iron Wharf, 31,
Bankside, London.—Retorts of superior quality, Socket and Flange Pipes, Bends, Branches, Syphons, and every description of Castings for Gas and Water Works, Gasometers, Tanks, Purifiers, Condensers, &c., erected complete, or the materials supplied.
Gas Valves and Sluice Cocks on an improved principle. Patent Gas Tubing and Connections.
A stock of the above articles kept.
The Pipes and Retorts supplied by M. K. are cast vertically, which ensures soundness and equality of thickness throughout.

PATENT SANITARY GAS SHADES.
These Shades, manufactured exclusively by RICHARRIS, and SON, on an entirely new principle, effectually destroy the effluvia and smoke, and diminish the heat, which have hitherto made the use of gas so objectionable in dwelling-houses and offices, where cleanliness, freedom from smell, and a cool atmosphere, are of importance. They are simple and inexpensive, and may be had at the Works, in a variety of forms adapted to the style of fittings or the taste of the purchaser.
ISLINGTON GLASS AND ALKALI WORKS,
BIRMINGHAM;
and 1, THREE KING-COURT, LOMBARD-STREET,
LONDON.
May 27, 1854.

By Her Majesty's Royal Letters Patent.

JOSEPH BOULTON,
PATENT DRY GAS-METER MANUFACTURER, and also Maker of his Improved WATER METERS
No. 28, BAGNIGGE-WELLS-ROAD, CLERKENWELL, adjoining the Police Office.—Late of No. 1, Coppice-row, LONDON.
Experimental and Station Meters of any size made to order on the shortest notice.—Governors, Pressure Registers, Gas-cooking Stoves, and every description of Gas Apparatus.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas Works and Water Works.
Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Office in London, Mr. E. M. PERKINS, 67, Mark-lane

ORIENTAL GAS COMPANY.—At an
EXTRAORDINARY GENERAL MEETING of the SHAREHOLDERS of the Oriental Gas Company, held at the London Tavern, Bishopsgate-street, London, on Monday, the 2nd day of July, 1855, Captain JAMES BARBER in the chair, the following resolutions were carried unanimously:—
Moved by the CHAIRMAN, and seconded by JOSEPH BROWN, Esq.:
"That the report now read to the meeting be received and adopted."
Moved by W. C. HARNETT, Esq., and seconded by T. W. POWELL, Esq.:
"That the capital of the company be increased to the sum of £100,000 by the issue of 50,000 new shares of £1 each, upon which a deposit of 2s. per share be paid."
Moved by CHARLES MORRIS, Esq., and seconded by J. A. CHOWNE, Esq.:
"That the new shares be issued *pro rata* to the present shareholders, or otherwise appropriated by the directors in the manner provided by the deed of settlement; and that the directors be authorised to make such arrangements as they may consider expedient with reference to the payment at future periods of the remaining amount of the new shares."
Moved by W. S. DREW, Esq., and seconded by J. A. FRANKLIN, Esq.:
"That the best thanks of this meeting be given to the chairman and directors for the able manner in which they have discharged their duties, and for their attention to the interests of the company."
JAMES BARBER, Chairman.
GEO. HUDSON, Secretary.
127, Leadenhall-street, July 2, 1855.

JOSEPH LAMB and CO.,
WALLBOTTLE COLLIERY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturers of FIRE CLAY RETORTS of all dimensions; FIRE BRICKS; and every other article in Fire Clay.
Also owners of HOLYWELL MAIN GAS COAL.

EIGHTON MOOR GAS COALS.—
Parties wishing to be supplied with these first-class Gas Coals will please to apply to Mr. MATTHEW NESBIT, EIGHTON MOOR OFFICE, NEWCASTLE-UPON-TYNE. These coals are well known as among the richest in gas, and working the roundest on the River Tyne. They are extensively used by metropolitan gas works.

JOHN BENT,
MANUFACTURER OF GAS METERS,
283, BELL BAND ROAD,
BIRMINGHAM,
(Established 1830),
Begs respectfully to call the attention of Gas Companies, Engineers, &c., to his WET GAS METER made upon the most improved principles, the most admirable materials, and warranted to register correctly.

TO GAS COMPANIES.
NEW PELTON MAIN GAS COAL.
Parties wanting a supply of these first-class GAS COALS, which are extensively used in the London and other gas works, will please to apply to MR. JAMES JOICEY, Newcastle-upon-Tyne.

TO GAS COMPANIES, FITTERS, AND IRONMONGERS.
LLOYD and SUMMERFIELD,
Manufacturers of CUT and FLINT GLASS Jet Moons, Globes, Hemispheres, and Chimneys of every description; Hall Lamps, Lustres, and Chandeliers of the most modern patterns.
PARK GLASS WORKS, BIRMINGHAM.

RETORT AND BOILER SETTING.
FREDERICK SIMMONDS, Sen.,
NO. 11, WELLINGTON-STREET, OLD FORD-ROAD.
thirty years RETORT SETTER to some of the lead ng London and Provincial Gas Companies, to whom he can refer, begs leave to draw attention to his economical mode of Setting Clay or Iron Retorts, &c.
F. S. will engage to provide all materials and labour, or labour only.

WEST and GREGSON,
GAS-METER MANUFACTURERS, &c.
UNION-STREET, OLDHAM.
Station and Experimental Meters, Gas Pressure Registers, Gauges, Experimental Gasholders, Governors, Slide Valves, &c. &c.
W. and G. would respectfully call the attention of Gas Engineers and Managers to their Station-meters, having made and erected the largest in use at the present time, two of which may be seen at the Stockport and Liverpool Gas Works, on application to the respective Engineers; also to the Paris Universal Exhibition, Class IV., Section I., No. 209.

THE ORIENTAL GAS COMPANY.—
Registered pursuant to 7 and 8 Vict., c. 110.—Notice is hereby given that, in accordance with the resolutions passed at an EXTRAORDINARY GENERAL MEETING of the SHAREHOLDERS of the above Company, held on the 2nd day of July, 1855, the HOLDERS of SHARES in this company will be entitled to PARTICIPATE in the NEW SHARES to be issued for the increased capital of £50,000, in proportion of one new share for every old share.
Applications for the new shares must be made in writing, stating the numbers consecutively of the old shares in respect of which the new shares are claimed; and the scrip certificates for the old shares must be produced at the office of the company on or after the 9th day of July instant, until the 30th day of July inst., between the hours of eleven and two. After the last-mentioned day, no Shareholder will be entitled to claim an allotment of new shares. Dated the 2nd day of July, 1855. By order of the Board,
GEORGE HUDSON, Sec.
N.B.—Forms of application may be obtained at the office of the company, No. 127, Leadenhall-street, and of Messrs. HILL, FAWCETT, and HILL, 29, Threadneedle-street.

LESMAHAGO GAS COAL.

JAMES FERGUSON and CO., Lessees of the Auchinheath and Craignethan Gas Coal-fields (the most extensive and valuable in the parish of Lesmahago), respectfully intimates to the Managers of Gas Works and Consumers of Gas Coal, that he is prepared to ship the best quality of the above well-known COALS at Glasgow or Leith; and also to deliver them at the railway stations upon, or connected with, the Caledonian Railway, to any extent which may be required.

Price, free on board, or delivered at the railway stations, may be learned by addressing James Ferguson and Co., Gas Coal Works, Lesmahago; or J. H. Jones, 1, Poets'-corner, Westminster, sole Agent for London.

RICKETS' Improved Gas Ranges of every description and size may be seen in operation at the Manufactory, Agar-street, Strand, LONDON.

Lists of prices, with engravings, forwarded free on application.

GREAT EXHIBITION PRIZE MEDAL, AND CERTIFICATE FOR GAS METERS, CLASS XXII., No. 494.

PADDON AND FORD,

PATENT GAS METER & APPARATUS WORKS, GRAY'S-INN-ROAD, LONDON,

Manufacturers of WET and DRY GAS METERS, STATION METERS, GOVERNORS, EXPERIMENTAL APPARATUS, GAS STOVES, LANTERNS, Iron Barrel and Fittings, Main Cocks, &c. &c.

Contractors for the erection or alteration of Gas Works; and every description of Apparatus required in Gas Works supplied. Competent men sent into the Country, and References given to work done.

PADDON and FORD are enabled, from the successful character of their workmanship and material, to guarantee the accuaracy and durability of their meters, either WET or DRY, for a stated period.

TO GAS COMPANIES.

J. W. GRAZEBROOK.

75, OLD BROAD STREET, LONDON,

Having applications for New and Second-hand Gas Apparatus, would be obliged by those Companies having Apparatus to dispose of, to send particulars. And Companies requiring Apparatus are solicited to apply.

PIPES, RETORTS, TANKS, GASHOLDERS, &c. on Shortest Notice.

STOURBRIDGE and NEWCASTLE FIRE GOODS. CONTRACTS TAKEN.

GEORGE and SAMUEL CUTLER,

GASHOLDER MAKERS,

No. 8, WENLOCK-ROAD, CITY-ROAD, LONDON.

Contracts for Tanks, Gasholders, Roofs, Purifiers, and all descriptions of Gas Apparatus executed on the most reasonable terms. Improved Slide Valves, Steam, and Range Boilers, and Smiths' Work, of the best materials and workmanship.

TO GAS COMPANIES.

THE BRYMBO COMPANY,

NEAR WREXHAM,

Manufacture Cold Blast Retorts and Pipes of a very superior quality, and also ship good Gas and Steam Coals at Saltney, on the River Dee, and at Birkenhead.

Brymbo Iron Works and Colliery, North Wales.

London agent, Mr. J. W. Grazebrook, 75, Old Broad-street.

WHITWELL PRIMROSE GAS COAL.—These excellent Gas Coals are wrought from the HUTTON SEAM *only*, and can be shipped either at the South Dock, SUNDERLAND; or Old Harbour, HARTLEPOOL; or Brandling Drops, SOUTH SHIELDS; on application to the WHITWELL COAL COMPANY, Sunderland.

PATENT FIRE-CLAY RETORTS.—O. BROTHERS and COMPANY, Manufacturers of O. Brothers's Patent, beg to state that these Retorts, being made in one entire operation, and in one piece, of any required shape, length, breadth, and height, are not liable to cracks and fissures, of which there is a just and general complaint; and consequently superior to, and cheaper than, any hitherto manufactured.

GREAT REDUCTION IN PRICES—30 per cent. cheaper than any other Clay Retorts manufactured.

Shape.	Sizes.	Length.	Thickness.	Price at Railway Station, Blackburn.	Price per foot run, of any required length, at Blackburn.
		feet.	in.	£ s. d.	s. d.
Dee	12 in. by 12 in.	8	2½	2 0 0	5 0
,,	14 in. by 12 in.	8	2½	2 8 0	6 0
,,	16 in. by 13 in.	8	2½	2 12 0	6 6
,,	18 in. by 14 in.	8	2½	3 0 0	7 6
,,	19 in. by 13 in.	8	2½	3 0 0	7 6
,,	20 in. by 14 in.	9	3½	3 12 0	8 0
,,	24 in. by 15 in.	8	2½	3 16 0	9 6
Round	15 in. by 15 in.	8	2½	2 12 0	6 6
,,	15 in. by 15 in.	10	2½	3 5 0	6 6
,,	18 in. by 18 in.	8	2½	3 4 0	8 0
Oval Retort	18 in. by 12 in.	8	2½	3 0 0	7 6

All other sizes and shapes in proportion, to order.

References and further particulars may be obtained on application to the Patentee, Gas Works, BLACKBURN.

F. & C. OSLER,

44, OXFORD-STREET, LONDON;

Manufactory—Broad-street, Birmingham,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, FOR GAS

(Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of Gas in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.

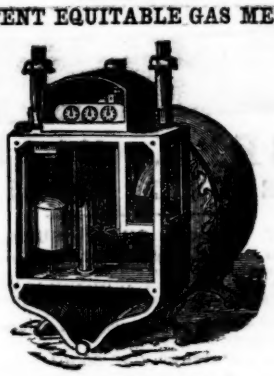
NOW READY.

VOL. III. of the JOURNAL of GAS-LIGHTING, price 32s. 6d., bound in cloth and lettered. Cloth cases for binding may be had at 2s. 6d. each. G. HEBERT, 88, Cheapside.

By Her Majesty's Royal Letters Patent.

KAY'S

PATENT EQUITABLE GAS METER



MANUFACTURED BY

WILLIAM COWAN,

BUCCLEUCH STREET, EDINBURGH.

The attention of Gas Companies is respectfully directed to the above important invention in Gas Meters.

The well-known fraud of "tilting" the Meter on one side, to enlarge the capacity of the measuring chambers, or allow the gas to pass unregistered, is entirely prevented by this invention; which simply consists in placing the Outlet on the front of the Meter, and inserting a Dip-tube, which immediately shuts off the gas the instant the Meter is thrown off its level.

Another important advantage in this arrangement of the Outlet is, that the Measuring Wheel is entirely protected from frauds, by being pierced or otherwise tampered with.

The above alteration of the Outlet does not in any way affect the present arrangement of the Fittings, this Meter being adapted to the Fittings at present in use.

SHEARS AND SONS'

PATENT DRY GAS METERS

Are supplied to Gas Companies and the Public as the best and simplest Dry Gas Meters in use. They are acknowledged to be of first-rate workmanship and accuracy of registration.—Shears and Sons continue to supply these Meters on the most favourable terms; and they also manufacture Wet Gas Meters, to which they apply their Patent Indices.

BANKSIDE, LONDON.

ADDISON POTTER,

WILLINGTON QUAY,

NEAR NEWCASTLE-UPON-TYNE,

Manufacturer of Clay Retorts, Fire Bricks, and every description of Fire Clay Goods.

WHITEHOUSE and CO.,

GLOBE PATENT TUBE WORKS, WEDNESBURY,

Beg to draw the attention of Engineers and Managers of Gas Works to the superior quality of the Article they manufacture, both in respect of the iron employed, and the perfect manner in which it is welded; in proof of which they can refer to the testimonials of the most eminent Gas Engineers, and the experience of the principal of the large Gas Companies of the kingdom.

Orders promptly executed.

IMPROVED

SELF-LUBRICATING GAS VALVES,

Used in nearly one hundred gas works in Great Britain and the Continent, and are esteemed for their strength, superior workmanship, non-liability to damage, never sticking, oiling themselves, always working free in tar, lime, or gas, never falling down, and their very legible index of opening of valve—advantages only possessed by these valves.

SELF-REGISTERING GAUGE COLUMN

To regulate the pressure in the Street Mains, showing at one glance the valve on the facing, area of the opening, size of pipe the gas passing will fill, and the pressure on the works and on the mains. This supersedes the necessity of the expense of a governor for small works, and should be placed on the by-pass, where a governor is used in large works. IT IS NEXT TO IMPOSSIBLE FOR THE VALVE MAN TO PUT A TOWN IN DARKNESS WITH THIS APPARATUS, and is a great ornament to the Valve-room.

IMPROVED ANNULAR CONDENSER.

Ensures perfect condensation with smallest weight of iron, and standing on the smallest space, the whole of the parts being instantly accessible. They are in use in various Gas Works, small and large, and passing 20,000 to 600,000 cubic feet per 24 hours.

DRY LIME AND OXIDE OF IRON PURIFIERS.

Perfect simplicity of action and improved Sieves, which are strong and very lasting, and the wires, when worn out, may be replaced in an hour and a half by any handy man in a gas work. The undersigned have made them, and have patterns for every size from 3 feet to 18 feet square.

GASHOLDERS, SCRUBBERS, &c.

CHARLES WALKER AND SONS,

LITTLE SUTTON-STREET, LONDON, AND MIDLAND IRON WORKS, TIPTON, STAFFORDSHIRE.

Applications for Prices, &c., to be addressed to their London Office, as above.

PATENT FLEXIBLE GAS TUBING.

JAMES LYNE HANCOCK'S

Vulcanized Indiarubber Hose Pipes and Tubing. Manufactory (and Warehouse), Goswell-mews, Goswell-road, London.

Gas Companies, Engineers, Gas Fitters, and the Trade generally, are respectfully informed this Tubing is now manufactured to any size, from ¼ inch bore and upwards, in 100-feet lengths, and perfectly cylindrical, either with or without a spiral wire inside.

VULCANIZED GLAZED FLEXIBLE TUBING, from ¼ inch up to 1 inch diameter, made in 24-feet lengths; or, covered with silk or worsted, up to 100 feet.

VULCANIZED HOSE, for FIRE ENGINES, BREWERS' USE, and for standing great pressures, (Rubber and Cloth combined), made to any length or size to fit the necessary screws, &c.

VULCANIZED INDIARUBBER AIR-TIGHT BAGS, made any size, for Gas Mains, with flexible tubes attached, and fitted with stopcocks complete.

CARTER'S PATENT SAFETY GAS VALVES.

THOMAS LAMBERT and SON,

PATENTEES AND MANUFACTURERS,

SHORT STREET, NEW CUT, BLACKFRIARS, LONDON.

The Bank of England is fitted entirely with these Valves, from the smallest branch to the largest main pipe.

The following, among numerous testimonials, will be found very satisfactory:—

"The British Gaslight Company's Office, No. 105, Broad-street, Ratcliff, London, June 10, 1846.

"Gentlemen,—In reply to your inquiry, I have to state that 'Carter's Patent Gas Valve' has been used by this company and by the fitters of the district extensively for seven years past. It was adopted to obviate the inconvenience of setting fast, so prevalent with the conical metal plug-cocks, and has been found to answer the purpose intended.

"I have recommended its use in several provincial towns with which I am professionally connected, and have not received any complaint of its having failed in any respect of performing satisfactorily all that is required of it.—I am, gentlemen, yours respectfully,

"GEDDES PEARSE.

"Messrs. Lambert and Son, Lambeth."

TO GAS COMPANIES, GAS PROPRIETORS, AND GAS ENGINEERS.

JOHN VICKARY

begs to call the attention of the above to his improved METALLIC CASE GAS-METER, an improvement which has met with entire approbation from the various Gas Companies and Engineers to whom he has introduced it, and acknowledged to be the greatest improvement that has been made since the year 1832; at which period a metal was introduced for the construction of the Drum, Syphon, and Float, capable of resisting any impurities arising from either gas or water, which has been found to answer every expectation; as, in repair, Drums of the above date are found in perfect and good condition, when the Outer Case, Valve-box, Inlet-pipe, &c., are quite destroyed and entirely past repair.

J. V. has introduced a coating or lining of the above metal in the Outer Case, Valve-box, Inlet-pipe, &c., thereby rendering the whole as durable as the Drum, as not a particle of tin plate is exposed to the action of either water or gas; and preventing the possibility of gas passing above the water line through the front into the body of the Case to the outlet unregistered, which frequently occurs. When the Meter has been in use for any length of time it is generally found that rust or decay takes place *above* rather than under the water line, which is only discovered when they need repair. Also the Inlet-pipe and Valve-box are generally found quite decayed, which cannot happen in the above improvement.

J. V. feels confident that the above will be found a most desirable and perfect instrument, as it contains all other improvements of utility that have been introduced up to the present time.

The most strict attention is given to the workmanship as well as the registration of every Meter, to render them perfectly accurate.

Station Meters, Governors, &c., made on the shortest notice, as well as Gas Cooking Apparatus of every description, Gas Baths, &c.

Meters sent at the lowest London prices.

Carriage paid to any part of England.

WEST OF ENGLAND GAS METER AND GENERAL GAS APPARATUS MANUFACTORY, 84, FORE STREET, EXETER

NEW HOUSES OF PARLIAMENT.

DEFRIES'S Gas Stoves, Ranges, and BATHS, in action for two years at the above building. A great variety in stock upon the same principle. Gas Baths from £7, by which a warm bath may be obtained for 1½d. Gas Cooking and Heating Stoves, from £1. Defries's celebrated Dry Gas Meters —upwards of 60,000 in use.

Testimonials at the Office, 145, REGENT-STREET, or at the Manufactory, NEW-ROAD, St. Pancras, near Fitzroy-square.

HARRIS AND PEARSON,
PROPRIETORS OF
BEST GLASS-HOUSE POT AND CRUCIBLE CLAY.
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King.
Originally J. Pidcock, Esq.

JAMES PINCHBECK,
GAS METER MANUFACTURER,
26, CAMDEN-STREET, and 9, PIERREPOINT-ROW,
ISLINGTON, LONDON.

Begs respectfully to announce to Gas Companies and Fitters, that from upwards of 20 years' practical experience, he is enabled to supply a METER combining correctness, durability, and economy.

N.B.—Repairs on the lowest scale.

JOSEPH CLIFF,
WORTLEY FIRE-BRICK WORKS, near LEEDS.

FIRE-CLAY RETORTS, OF ANY SIZE OR SHAPE, SUPPLIED ON SHORTEST NOTICE.

These Retorts are used extensively in the Gas Works of Leeds, Hull, Liverpool, Bradford, Rochdale, and other towns, where they have been tested side by side with those of Stourbridge, Newcastle, and other makes, and proved themselves a superior article.

Eminent Gas Engineers bear testimony that they are the BEST FINISHED AND MOST CORRECT IN FORM of any in the kingdom. Their surfaces are, by the peculiar method of their manufacture, unusually smooth, close, and FREE FROM SURFACE CRACKS; thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surfaces.

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N.B.—FIRE BRICKS, TILES, AND OTHER FIRE GOODS, OF UNEQUALLED QUALITY.

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PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas Works, in stock, on wholesale prices, at

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Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including best cold-blast iron Retorts, Socket and Flange Pipes of all sizes, Bends, Branches, Syphons, &c.; also Lamp Columns of different patterns.

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GAS MANUFACTURE.

GEORGE BOWER, Vulcan Foundry, ST. NEOT'S, HUNTS, will be glad to prepare Plans, Specifications, and Tenders, for the lighting of Towns, Manufactories, and Private Houses with Gas.

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